Free Plan versus Free Rooms: Two Conceptions of Open Architecture

Xavier van Rooyen

From the mid-twentieth century onwards, architects have widely questioned the static and perennial nature of architecture. Kisho Kurokawa, co-founder of the Metabolist movement, saw this static conception of architecture as a constant in Western societies, where monuments emanate 'an aesthetic of eternity.' While in Japan 'the Ise shrines are rebuilt every twenty years in the same form, or spirit', in the West we aim to preserve 'the actual Greek Temple, the original material, as if it could last for eternity'.[1] A paradigm shift from considering the monument as eternal to an impermanent architecture gives architecture an indeterminate, open-ended character – a trend that was widely developed in the 1960s, particularly by the structuralist movement, which represents what we now understand as open architecture. One of the pioneers of Dutch structuralism, Herman Hertzberger, notes how

> structuralism in its authentic guise opens up all perspectives in which a building is able to hold its ground and at the same time attune itself to the programmatic uncertainty that holds sway over all our designs from start to finish. Essential to structuralism is the openness of the system, a fundamental incompleteness, more like a city that keeps changing than a well-rounded architectural composition, which is how architects like to see their buildings.[2]

In Hertzberger's words we can identify a tendency towards indeterminacy in architecture, both as a means to reflect programmatic uncertainty and to provide a stable framework that remains open to functional instability. We can also detect a critique of compositions that result in fixed architectures, incapable of incorporating change. Hertzberger's acknowledgment of the temporal dimension of architecture requires that buildings break free from the ideal of imperishability and become open to change. 'It is certainly not true that there is always one specific form that fits one specific purpose.'[3] Quite on the contrary,

> the future of architecture depends on its competence to be transformed … The notion that buildings are objects complete in all their parts, with a final form expressing a static condition and clearly circumscribed entity, has long been at odds with today's dynamic culture of democracy, where decisions are a concerted effort, as are the urgent calls for change.[4]

The adaptability of architecture frees space from fixity and makes it possible to reconfigure it without 'significant effort, disturbance and expense' from its users.[5] Striving for an indeterminate architecture therefore requires that from the outset, flexibility and change are taken into consideration in the design of new projects. Although it is obvious that every building can undergo alterations during its physical existence, what makes indeterminacy special is its capacity to maintain an overall coherence without altering the building's dimensional structure.[6] In this regard, another Dutch architect, John Habraken states that open architecture 'seeks to respond to users' preferences by offering the flexibility needed for adaptation of individual units over time'.[7] In his

brief introduction to *Open Building*, relayed on the Open Building website, he notes how 'the idea that built environment is in constant transformation and change must be recognized and understood'.[8] Architects who subscribe to Habraken's open building approach 'seek to formulate theories about the built environment seen in this dynamic way and to develop methods of design and building constructions that are compatible with it.'[9]

Currently, many commissions presented to architects reveal 'the growing importance of managing flexibility and unpredictability in the design process'.[10] Although it is well known that unpredictable future uses and necessary transformations can always result from economic, social, and cultural change, few studies focus on understanding the design processes that are implemented to deal with them. The ambition of this article is therefore not to trace the origin of indeterminate thinking in architecture, together with its social conditions.[11] My aim is instead to grasp 'the logic underlying the making of a form, the logic of a generative process' of indeterminate architecture.[12]

In order to apprehend the logic underlying the making of an indeterminate architecture, I will investigate the principles that actually give shape to indeterminacy in architecture. The research is thus anchored in the field of formal heuristics.[13] The different case studies presented here are carried out via diagrams that are 'almost reduced to a simple line intended to indicate the form and arrangement of objects'.[14] This allows our attention to remain focused on the relationships between the different buildings' elements and parts rather than on the elements themselves. Knowledge of design processes is part of what Julien Guadet considered 'the science of architecture.'[15] On these grounds I will investigate a number of research objects as alternatives to conventional forms of open architecture, in order to provide knowledge in the field of formal heuristics for the use of researchers, students of architecture, and architects interested in indeterminacy and openness in their profession.

In his 1988 book *Raumplan versus Plan Libre,* Max Risselada notes how 'comparison is one of the means through which design can be discussed – of vital importance in a situation in which the educational program can no longer be constructed around one all-encompassing architectural theory'.[16] Risselada's book focuses on the pre-World War II period, and compares the work of Adolf Loos and Le Corbusier. The essential distinction we make between 'room' and 'plan' is based on his comparison. Whereas Le Corbusier sought to liberate the plan from the static, fixed conception of the traditional bourgeois house by proposing the free plan, Adolf Loos proposed a 'building of rooms'.[17] Based on this example we can establish an opposition between an architecture composed of an assembly of rooms and the conception of an open plan within which a series of functions will be arranged. According to Risselada, Adolf Loos never theorised his concept of the Raumplan. Nevertheless, in 1929, in his obituary for Josef Veillich, Adolf Loos wrote:

> When I attempted to have a house exhibited in Stuttgart (in the Weissenhofsiedlung), I was turned down flat. I would have had something to exhibit: the solution of how to arrange the living rooms in three dimensions, not in the flat plane.[18]

It was Heinrich Kulka, an architect and a student of Loos, who promoted the idea of the Raumplan. In 1931 he noted how the plan, with Loos, is 'not confined to a single storey, composing related rooms into a harmonious, indivisible whole'.[19] Although the design of a Raumplan can be taken for a novelty in the way rooms are linked in the third dimension of space, those same rooms still retain a specific, and therefore static, character. Risselada confirms this when he notes that 'the bourgeois residence with its specialized, separate room is thus transformed into a house with rooms which open into one another but without losing their own identity'.[20] Although the specific character of each

room is maintained, it is interesting to note that Loos had become critical of the closed form of total works of art as early as 1924:

> A home should never be finished. Is man ever complete, finished in physical or mental terms? Indeed, does he ever come to a stop? And if man is in constant motion and development, if old needs pass and new needs arise, if the whole nature itself and all around us is in a state of change, is the thing closest to man, his home, to stay unchanged, organized for all eternity? No. It is ridiculous to specify where people should put a thing, to organize everything for them from the lavatory to the ash-tray.[21]

These words, as they were written more than thirty years before the founding of Team 10, seem prescient of Oscar Hansen's lecture at the first Team 10 meeting in Otterlo in 1959. Hansen introduced his lecture criticising the shortcomings of architecture as it was practiced theretofore, and then denounced 'closed architecture' for promoting the 'decay of environmental features' and for its inability to adapt to 'life changes'.[22] According to Hansen, it was Josef Hoffman who had explicitly conceptualised 'closed form' in architecture with the construction of the Palais Stoclet in Brussels in 1904. Hoffman's is one of those cases in which a super-specialised architect has to solve a relatively small problem and is therefore able to 'determine the order of all things – from the urban scale to the door knob'. For the speakers at the Otterlo conference, this could not be the architectural solution for what they referred to as the 'greater number'. The concept of total art should stop at the borders of private space.

On these grounds I intend to continue the debate initiated by Risselada by discussing alternatives to open architecture in terms of 'free plan' and 'free room'. I will explore these two conceptions in the work of Office KGDVS, MVRDV, Sanaa, and Sou Fujimoto, who have explicitly set the stage for an open conception of architecture in our time, and who implement these two conceptions in the way they conceive their architecture.

Free plan

At the beginning of the twentieth century, modernist architects questioned the compositional unity of the room, and moved towards the quest for an 'absolute freedom of plan'.[23] For Le Corbusier, the plan's freedom that resulted from the development of the column-slab framing system was a fundamental questioning of the 'paralysed plan of the stone house'.[24] In other words, it was the fixity of things that Le Corbusier was questioning when he proposed free plans in which 'the organs have become characterised; have become free with respect to each other'.[25]

In Le Corbusier's proposal of the *Plan Libre* – as he referred to the free plan – the structuring of space is made possible by the secondary system of non-loadbearing elements, or partitions. In an article from 1959, Georges Candilis notes how, in an indeterminate space, fixed elements form 'a system of permanent reference points, necessary for the stability of the individual'.[26] Meanwhile, the organisation of spaces and the separation of functions are not characterised at all. The structure of the free plan – a column-slab system – thus 'refers to what the individual user cannot change, while the infill is what the individual user can freely decide' and alter.[27] According to Bernard Leupen, in order to provide maximum flexibility the architect must focus on permanent elements, understood as 'the framework within which change can take place; while the framework is specific, the space within the framework is general'.[28] By acting within this framework, the individual is able to reconfigure space and remodel the initial order. In other words, spatial flexibility escapes composition whenever 'the structure and exterior shell is fixed and designed to accommodate the flexible and changeable infill systems based on users' needs and desires.'[29]

Clearly, the modernists' ideals in this regard failed, when applied to the scale of housing. In fact,

dwellings and large housing estates cannot escape the need to enclose certain rooms. In Le Corbusier's celebrated residential units, based on the principle of a bottle rack, the frame virtually reconstructed the walls he wanted to avoid. When developed for other programmes, though – particularly the office building – the free plan did manage to free itself from the need for creation of rooms for each user or use. In his study of New York, Rem Koolhaas praised the typical New York office building plan:

> Beyond a certain scale it is important that a building has its own integrity, its own clarity and its own sculptural or architectural quality and that within this enormous envelope of the building, the different programs are established almost like grottos or like autonomous projects, so that the building has an envelope that plays its own role in the life of the city and that answers all the demands the context asks.[30]

For Koolhaas, 'interior and exterior architecture become separate projects, one dealing with the instability of programmatic and iconographic needs, the other – agent of disinformation – offering the city the apparent stability of an object'.[31] In order to meet the internal challenges of an indeterminate programme, or to cope with unstable demands, the plan must be essentially 'neutral'[32] and 'undefined'.[33] It must also be multiplied so that 'the typical plan' can imply 'indeterminacy'. The only elements that must be defined within are vertical circulations, loadbearing structure, and the geometric layout of the perimeter, undermining any spatial configuration or hierarchy and therefore making it undetectable. Regarding the perimeter, this is an 'architecture of the rectangle; any other shape makes it atypical'.[34] Within this constraint the typical plan is repeated vertically to allow for the insertion of various programmatic 'grottos', which can accommodate change and thereby lead to programmatic indeterminacy – a clear evocation of Le Corbusier's Dom-Ino system where each plateau becomes the support for an unlimited number of independent programmes.[35] [Fig. 1] It is essential to highlight the importance of defining a stable envelope as support for the indeterminate platforms which allow Koolhaas to 'combine actual indeterminacy with architectural specificity'.[36]

The simple proliferation of columns in a regular grid on the plan, supporting stacked floors, allows for perpetual mutations with minimal interference in the perception of the architectural envelope. Like in the Dom-Ino system, slabs are smooth. There is no directional suggestion, no beam drops, 'no ribs. This device allows the construction of completely free partitions on each floor, without being superimposed on each other: the principle of "free plan".'[37] Koolhaas's fascination with this structure found a symbolic embodiment at the 2014 Venice Biennale, which he curated. Right in front of the exhibition's central pavilion he had the Dom-Ino structure reconstructed to celebrate its hundredth anniversary, according to the dating given by Le Corbusier.

More recently, the architects of MVRDV have questioned the necessary unity of the envelope and the rectangular regularity of the plan, which according to Koolhaas ensures the neutrality of the whole. Concretely, MVRDV has tried to take the question of specificity to the so-called greatest number by exacerbating singularity within multiplicity – a theme which the group has explored in a whole series of projects. For these architects, focus on multiplicity implies a paradigm shift, especially in the case of housing.[38] In their words, 'contemporary architectural thinking observes a shift from the pursuit of a singular housing solution to the need for variety and (climate, economic and cultural) idiosyncrasy'.[39] Based on this premise contemporary architects can move away from 'the modernist project (which) has seen architects doggedly pursue the design of an "ideal" dwelling'.[40] Singularity that is still able to express multitude thus becomes central to MVRDV, as they move away from neutrality and homogeneity. With the realisation of their pavilion for the World Exhibition in Hanover in 2000, MVRDV asserted that their work can 'serve as a symbol for

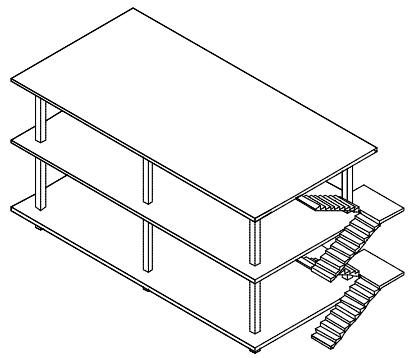

Fig. 1: Axonometric view of the Dom-Ino structure designed by Le Corbusier (1914). Drawing: author.

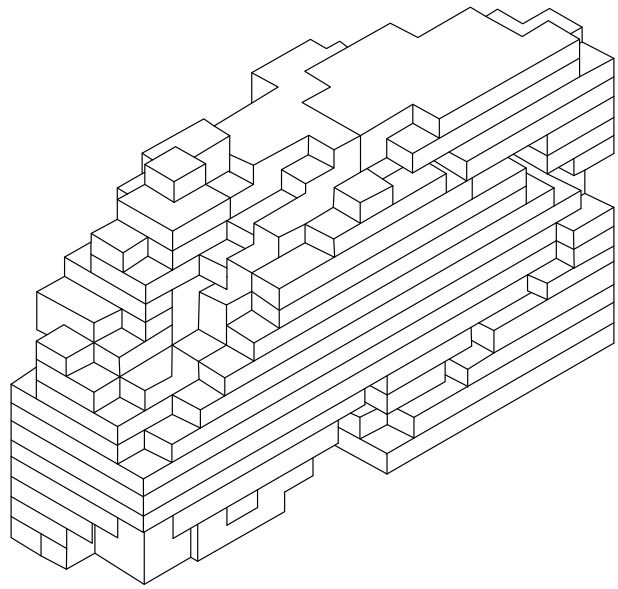

Fig. 2: Pixelated volume diagram of MVRDV's DNB headquarters, Oslo (2012). Drawing: author.

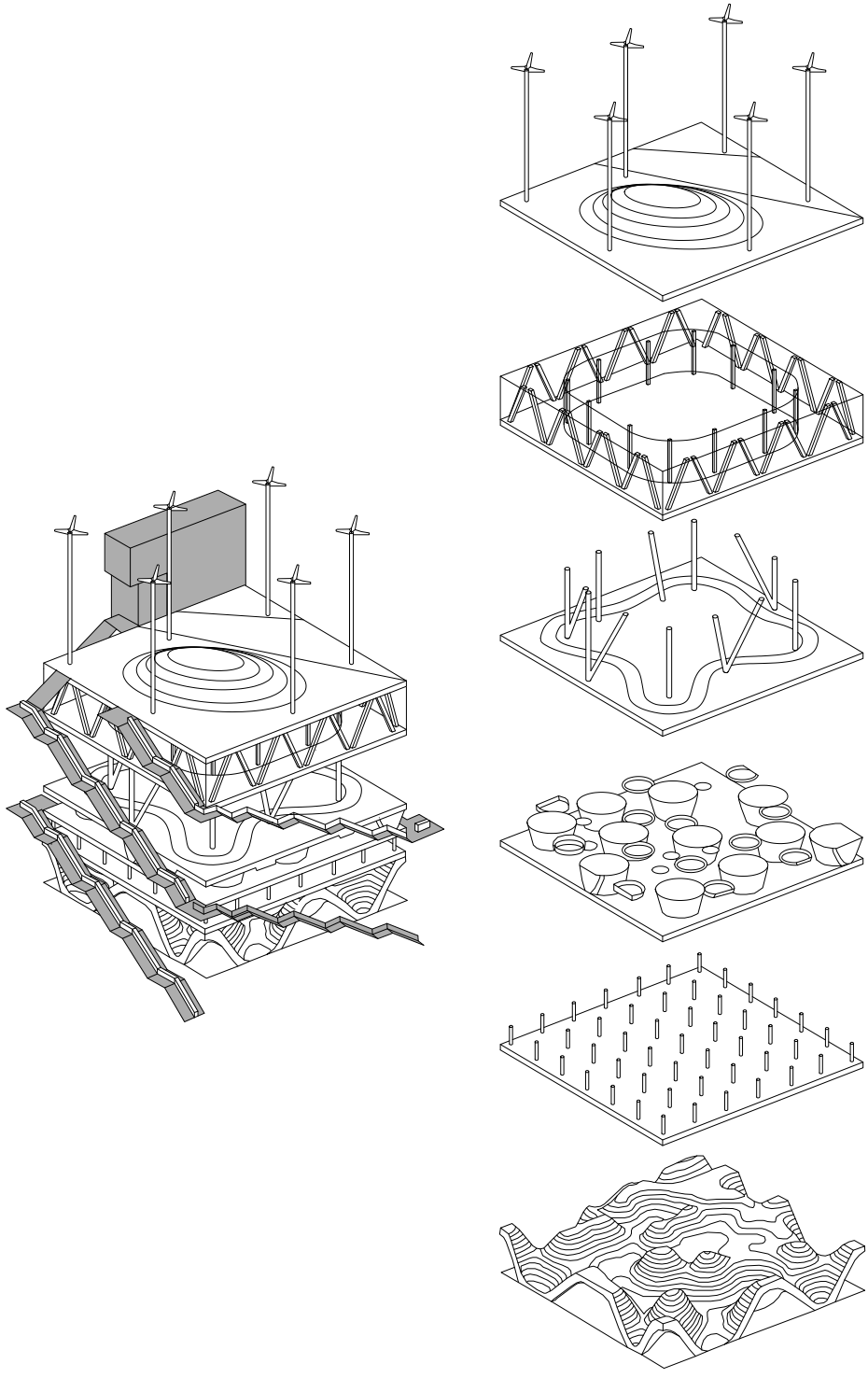

Fig. 3: Diagrams of MVRDV's Hanover pavilion (2000). Left: peripherical circulations; right: free plans. Drawing: author.

the multi-faceted nature of society: it presents the paradoxical notion that as diversity increases so too, seemingly, does cohesion'.[41] This statement is ironically in line with Koolhaas's observation that the cohesion of a system is strengthened by its multiple natures.

In their project for the central bank building for DNB's headquarters in Oslo, MVRDV continued investigating the neutrality of the 'typical plan' for an office program. Although the architects consider office floors to be generic, they 'pixelate' different floors in a differentiated way to increase their specificity within a system. In doing so, 'the pixelated design allows this specific response while being highly efficient and flexible. As a result, every floor of the building is both unique and generic: the pixelated volume makes the generic specific'.[42] The programmatic indeterminacy of the typical layout now takes place in superimposed plans of diverse nature, asserting specificity – also at the level of the envelope, which is no longer the result of a unitary component, but multiple. [Fig. 2]

This reference to the multiple is also hightly significant of change in the axis of thought concerning the universalist model, which rather envisages architecture from solutions applicable to the mass. If we stick to the definitions later given by Negri and Hardt, the multitude is 'an open and expansive network in which all differences can be freely expressed and, at the same time, a network that allows us to work and live in common'.[43] The multitude differs from the mass in that it is not homogeneous, and is as much an expression of the many as of its diversity. This assertion is essential in MVRDV's approach.

Superimposition of singular free plans

In 2000, at the World Expo in Hanover, MVRDV made a remarkable proposal. While Koolhaas saw in the New York tower the possibility of superimposing typical and neutral plans, contained in a specific envelope, MVRDV appropriated the language of superimposed plans as a plastic expression of multiplicity. The resulting whole offers the architectural spectacle of a 'monumental multi-level park'.[44] Each level of this park is designed independently and incorporates different forms of nature on each plateau. The neutrality of the typical plan, which Koolhaas advocated for and which allowed for the free development of any programmatic scenario, finds a specific impregnation here. By singling out each floor, the overall becomes 'specific' in form, and furthermore, moves away from the initial neutrality of the typical stacked plans. The proposal superimposes different landscapes, including dunes, greenhouses, forests, dikes, and polders. Each form of nature finds its own structural expression, reinforcing the singularity of each stratum. Thus, the more 'diversity increases, so too, seemingly, does cohesion'.[45] Staircases, on the other hand, are pushed out to the building's periphery. [Fig. 3]

Twenty years later the architects were invited to give new life to the pavilion. Utilising the potential offered by the large superimposed free plans, the conversion of the pavilion confirmed the openness of each plateau's programmatic indeterminacy, and their ability to receive varied programmes. 'The original design was certainly a unique design for a very specific purpose, but despite its outspoken design its core structure is highly reusable and more flexible than originally imagined'.[46] In its 2020 conversion, the plastic expression of the multiplicity of programmes was maintained. This time around, the proposed programme included a 'functional office environment that nevertheless retains the unique experimental features of the Expo Pavilion.' Within that environment users are able to 'work on the dunes, or in the forest, or between the tree-pots',[47] affirming the architects' desire to design 'objects that are capable of modifying their qualities and characteristics in the future.'[48]

Through the superimposition of specific free plans with multiple expressions and the insertion of specific infills, the two versions of MVRDV's Hanover pavilion transcend the expressive uniformity of the Dom-Ino structure – a neutral plane

simply repeated vertically. Instead, they express an aesthetic of multitude, generating a second degree of indeterminacy which can be perceived at the aesthetic, rather than at the programmatic level of the building (MVRDV's Silodam project offers another good example of this strategy). The programmatic and aesthetic freedom achieved on each floor can be perceived individually, and allows users to express themselves according to the passing of time via successive decorations. In this sense this architecture is able to anticipate aesthetic obsolescence by incorporating a degree of plastic indeterminacy. The plasticity of the architectural object is in constant change, and evolves piecemeal. Fragments develop independently of each other without breaking the system, just like Koolhaas theorised of the New York archipelago: 'The more each "island" celebrates different values, the more the unity of the archipelago as system is reinforced. As such "change" is contained in the component "islands", such a system will never have to be revised'.[49]

These 'islands' are exactly what MVRDV conceptualised at the architectural rather than at the urban level, engendering an open-ended, indeterminate aesthetic which questions our plastic perception of architecture's capacity to evolve without increasing a building's initial volume or altering the system that presided over its design. Since this capacity to evolve is largely due to unforeseeable interventions by users it also offers a degree of individuation of the architecture; a freedom of appropriation that allows each user to make 'the maisonette his habitat'.[50] Elaborating on some of the principles developed in the Hanover pavilion, the project for the new headquarters of Flemish television by Office KGDVS also superimposes different forms filled with different layers. According to the architects, 'the architecture is both open and specific', and each unitary volume within the project offers a specific free plan, different from the others.[51] Once assembled, these different geometries propose a multiplicity of aesthetically specific free plans.

Free rooms

So far we have seen how indeterminacy and openness in future appropriations have been made possible at the scale of the free plan. Through the design of the plan itself, we can identify a similar ambition at the level of the quintessential architectural fragment and compositional element: the room. As Nathaniel Cortland Curtis notes, 'the room is the nucleus and starting point of the architectural composition. ... the arrangement of rooms in a logical sequence and order may then be said [to be] the primary object of architectural composition'.[52] This observation is shared by Louis I. Kahn, for whom 'the room is the beginning of architecture',[53] which can then evolve into 'a society of rooms. The rooms talk to each other and decide on their position.'[54] The term 'room' thus acquires a double meaning, as both building-fragment and space, and raises the question of the different ways in which fragments can be assembled in order to achieve 'the realization of the form in an order'.[55]

A key figure in the architectural postmodernism of the 1960s, Robert Venturi, also questioned the room as an indeterminate, uncharacterised vehicle for flexibility, departing from earlier conceptions. In *Complexity and Contradiction in Architecture* he states that

> the multifunctioning room is a possibly truer answer to the Modern architect's concern with flexibility. The room with a generic rather than a specific purpose, and with movable furniture rather than movable partitions, promotes a perceptual flexibility rather than a physical flexibility, and permits the toughness and permanence still necessary in our building. Valid ambiguity promotes useful flexibility.[56]

The generic aspect of the room – the fact that it has no fixed character – encourages multiple uses. One could even say that rooms are, as Peter Cook would say, 'infinitely open'.[57] Their indeterminate character allows us to advance the concept of the free room, which complements the free plan. Free rooms have

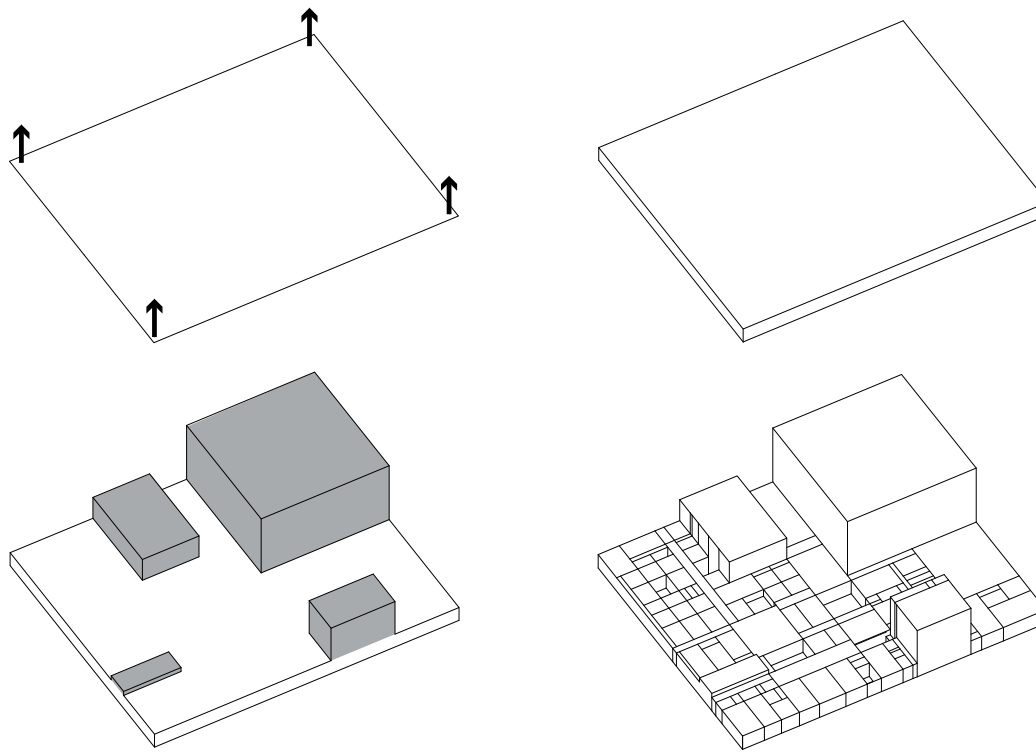

Fig. 4: Diagrams of Sanaa's Almere Stadstheater (1998-2006).Top left: plot delineation; top right: plot extrusion; bottom left: studios; bottom right: society of free rooms. Drawing: author.

a multifunctional character, and when assembled with other rooms of the same nature generate plans that can be reconfigured continuously. This reconfigurable character can be observed in some of Sanaa's projects, such as the theatre De Kunstlinie in Almere. In this latest project, the plan seems to be inscribed in a banal rectangular shape, but its division does not seem to proceed by cutting up the total figure. Instead it results from the assembly of rooms that are combined to define a figure. This particular ensemble tries 'to generate something like the flexibility of a system or method through the repetition of units of space'.[58] In such a random associations of rooms, 'which goes next to which is impossible to decide'.[59] The plan, on the other hand, only evokes a transitory state – one possible configuration among many others. In this context, rooms are contiguous, linked together amid different possible circulations. The whole is just a 'collection of different rectangular rooms'.[60] For Cédric Schärer, the plan of this particular project

> is inscribed in a banal form: a rectangle. Its layout is not based on the division of the total figure, but is reconstituted almost naively into a whole by conglomerating simple parts combined in such a way as to fill the perimeter, in the manner of a jigsaw puzzle/origami.[61]

Within such plan, parts 'are connected without hierarchies allowing a more flexible use of the service centre'.[62] This way the indeterminacy of each free room promotes 'more flexible relationships between a program and its users'.[63] This transformative, permutational logic defines an indeterminate universe where each part can take a different place and each room has 'a generic rather than a specific purpose'.[64] [Fig. 4]

To circulate through this system and its fragmented plan, the Almere theatre imagines users wandering around, in order to conceive 'a sort of interior public park', which offers users a diversity of interactions and possible encounters, as well as different possible movements without apparent hierarchy or centralisation.[65] On the outside, the horizontality of the overall figure responds to the landscape – a lake in front of which the project is located. However, one aspect of the programme is strongly determined: the three performance rooms and the recording studio. Their volumes emerge from the horizontal landscape of the lake, from the banal and generic form of the interior public park. As a result, these items of the programme acquire the status of stable elements.

Contrasting with free plans, this assembly of generic rooms is achieved by using a grid of walls rather than columns. In the Almere project, the loadbearing and infill elements are all of the same thickness, making the difference between them indistinguishable. An interest in the wall grid, and therefore in the rooms that are formed by that grid, is also evident in the work of Office KGDVS, as we can see in the house they built in Buggenhout. The plan of this house is also made up of a set of rooms of the same size, which add up to a figure divided into nine squares. These rooms do not have a conventional character, but the experience of rooms 'en enfilade' on both floors merely suggest ways of living, leaving it to the owners to find an identity for each. Each room is related to its neighbours but has no particular status; none of them stands out or predominates over the others.[66] All elements of the plan are equivalent. The plan is similar to John Hejduk's Nine Square Problem – a proposal for a series of houses in Texas, albeit structured by a grid of columns. By turning the columns of that scheme into walls, Office KGDVS marks the shift from free plan to free room.

For the Arvö Part Centre competition, located near Kellasalu in Estonia, the firm also proposes a 'set of rooms' which generate an environment of 'closely connected spaces, each with a unique relationship to the surrounding nature and the other rooms close by'.[67] This time the wall grid system allows for a free appropriation of spatial entities, within which a permutation of functions can easily

take place. Through its relative neutrality, the system allows for the emergence of vertical elements that contrast with the horizontal character of the project. These elements act as singular landmarks, while the rest of the plan remains attached to the ground and seems blurred, transitory, awaiting for definition – the expression of one possible form of organisation among many others. Notably, the collages assembled by the architects to communicate this project do not reveal any functions, but express instead the way in which users are expected to contemplate rooms and nature.

Contrary to the Buggenhout project, in the Arvö Part Centre the grid is no longer a simple 'waffle', but substantially grows and varies.[68] The dimension of every room is specific, but the overall programme is generic. The sloped roof underlines the growth defined by the plan, rising as much as the different rooms can grow. The grid pattern is thus subtly extended to the outside, giving the impression that the whole is still a fragment of something larger, or evoking the open-endedness of the grid. [Fig. 5]

Between these rooms, Office KGDVS allows visitors to wander freely and sinuously, erasing the rigid layout of the grid. Adjoining rooms open on three or four vertical planes, offering a multitude of routes that can be reconfigured from room to room. The programmatic indeterminacy of each room and the society of free rooms it allows for offer an interesting alternative to both free plan and to Kahn's clusters, resulting in a wealth of combinations and appropriations. This concept is remarkably illustrated in this project, which only evolved to the competition stage.

We can see how in the aforementioned projects by Sanaa and Office KGDVS design does have a clear focus on the plan. Loos's insistence on the need to arrange three-dimensional rooms, however, will find further development in the work of Sou Fujimoto.[69] In the 2008 project for House H, located in a residential area of Tokyo, Fujimoto refers to nature in order to conceptualise space. The tree-like architecture he refers to allows for the deployment of several branches that 'are simultaneously equipped with mutual relationships that allow one to sense the presence of others through the branches, interweaving a network of relationships across many points'.[70]

The plan of this dwelling is simple: a rectangle of 9.27 by 5.45 metres, divided, by two perpendicular walls, into four rooms of the same size. By contrast, the section is complex and the complex spatiality conceived by Sou Fujimoto consists of what the latter considers 'an imaginative Escher-like three-dimensionality'. Through openings in the perpendicular walls, 'staircases are installed at varying angles, insinuating the entrance within this geometric tree'.[71] The circulation crosses the different spaces and the staircases accommodates the crossing of half levels. This project crystallises the potential of the free room in section. [Fig. 6]

Free Plan versus free rooms, a synthesis

In his latest book *Contextes*, Bruno Marchand identifies strong morphological divergences in contemporary Swiss architecture that tend towards the definition of a heterogeneous fabric. By way of extension, this can be extrapolated to a number of European cities. Concretely, Marchand specifies that

> the architecture of housing is indeed subject to an expressive singularisation, which was still mostly reserved for public and representative buildings until the turn of the century, to make them 'remarkable' within the more anonymous built mass of private buildings.[72]

This necessary expressiveness of the multitude within the mass, which we already identified in the work of MVRDV and office KGDVS, is far removed from what architects were considering in the 1960s. The current focus on diversity is aesthetically assumed by MVRDV, or by Office KGDVS, via the superimposition of different universes – an evident update in the way openness is conceptualised for

architectural design. Collage, aggregation, and the stratification of free plans that are programmatically generic but aesthetically specific, are means towards flexibility of use and against the necessary obsolescence of contemporary programmes.

Another way in which contemporary architects proceed regarding openness, as we have seen, is to redefine the status of the room. While both Hertzberger and Venturi already realised the potential of polyvalence, nowadays that polyvalence is read at the scale of the room. To escape determinism of use some of the contemporary architects have chosen to get rid of any designation for their rooms, granting them instead a generic, non-determined character. Adaptability, or functional flexibility, leads to the removal of furniture from plans, as 'the function (of rooms) should not be predetermined by built-in furniture'.[73] Plans with standardised furniture and equipment are representative of a 'static, monofunctional' architecture. [74]

According to Jacques Lucan in his latest book *Habiter: Ville et architecture*, an urgent task for contemporary architects is to update the way in which we understand flexibility of use.[75] The shortcomings of most architecture – of housing, in particular – lie in its incapacity to assimilate multiple configurations and appropriations. Architecture must now make possible 'uses that will undoubtedly be even more diversified tomorrow than they were yesterday'.[76] In order to encourage those uses, architecture must be able to make the most of the possibilities that currently exist. In a recent article Bruno Marchand notes how 'for a long time, we were looking for fluidity, which resulted in the opening up of spaces. Today, we realise that this configuration makes it difficult to have multiple uses'.[77] In order to conform to new habits, we have to dismantle constructive automatism and look instead for versatility, modularity and reversibility. To escape fixity and obsolescence, a revision of the status of rooms, or more precisely of the relationships between them, is necessary. In addition to Sanaa's project for Almere, or to Office KGDVS's project for the Arvö Part centre, designing societies of free rooms can be understood as a search for singular expression within the multitude, especially for housing programmes. Sophie Delhay's 2019 project *La Quadrata,* situated in Dijon, is defined as a 'collection of identically sized rooms' which are freely assembled without any particular assignment.[78] More than ever, indeterminate uses, together with open systems and design processes, constitute the essence of contemporary projects, and lay the foundations for an approach to architectural design that is no longer oriented towards the homogeneity of parts, but towards the search for the multitude. The heterogeneity of programmatically indeterminate rooms goes well beyond Adolf Loos's formal explorations, and in that sense reassesses the potential of his work to generate a society of potentially three-dimensional indeterminate rooms. The Arvö Part and the Almere theatre are both two-dimensional projects, while the Buggenhout house offers a richer three-dimensional experience, reminding us that a plan is 'not confined to a single storey, composing related rooms into a harmonious, indivisible whole.'[79] In turn, Sou Fujimoto goes beyond the two-dimensional model, as he develops a three-dimensional society of interchangeable rooms. By convening the image of a tree within which the user can move, he reincorporates the complexity Loos attempted with his work. Fujimoto's work no longer unfolds in the simple plan, though; it involves a complex indeterminacy in section.

The projects discussed above, used to illustrate the shift from free plan to free room in the quest for an open architecture, are not to be understood as models to be reproduced. Nevertheless, the analyses developed in this article can serve as a basis to identify trends in the open design approach to architecture. Ideally, these trends will contribute to a better understanding of indeterminacy and help researchers and architects respond to the architectural and urban challenges they will face in the next few years.

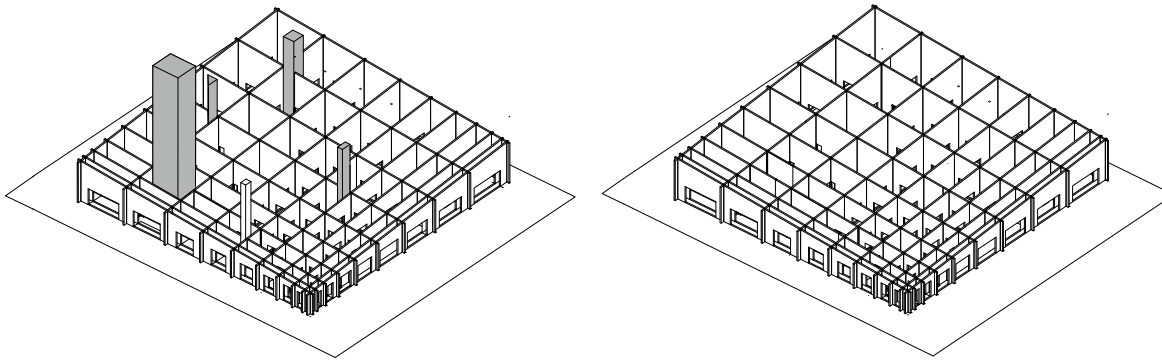

Fig. 5: Diagrams of Office KGDVS's competition entry for the Arvo Pärt Centre, Laulasmaa (2014).Left: wall grid society of free rooms; right: specific volumes. Drawing: author.

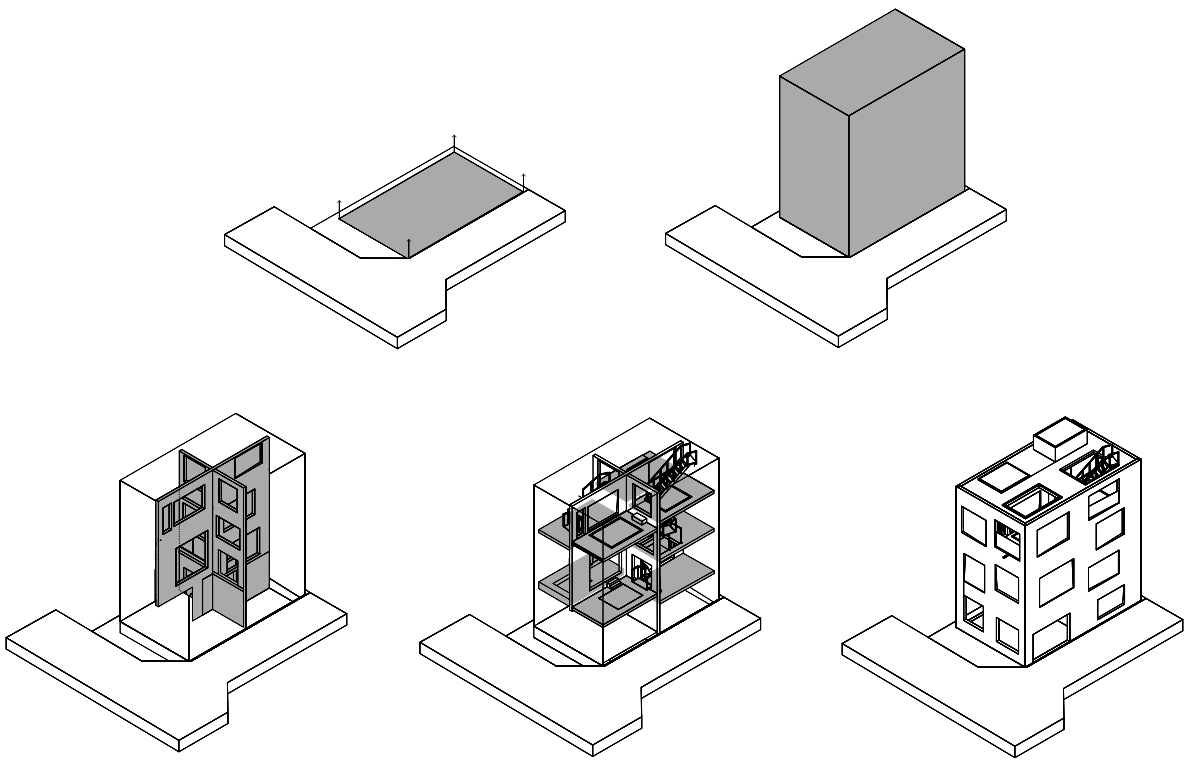

Fig. 6: Diagrams of Sou Fujimoto's House H, Tokyo (2008). Top left: plot delineation; top right: volume; bottom left: wall grid, bottom middle: three dimentional society of free rooms. Drawing: author.

A case in point is the inhabitability of vacant office spaces, whose specific free plans can anticipate obsolescence, as has already been noted in a 2011 editorial in the journal OASE. Such spaces still allow for singularity in a fabric that no longer has any homogeneity. In Brussels, for instance, 7.5 per cent of office buildings are currently vacant, adding up to a whopping 954 870 m2 of potentially inhabitable space.[80] By fragmenting the floors of these vacant office buildings, both in surface area and in their external plastic expression, architects could achieve an easy spatial and aesthetic reappropriation and absorb currently deserted free plans. Improving the capacity of office buildings to mutate is a challenge for architects and urban planners who must anticipate the obsolescence of previous forms of open planning. The free room, as described above, affirms a renewed interest in the adaptability of spaces and architects' ability to take into account the evolution of uses and users' preferences. The wall grid system, on the other hand, opens up new perspectives to supersede the flat plan that Loos and Kulka envisioned, but also to overcome the fixity of the 'paralysed plan' described by Le Corbusier. The development of a three-dimensional free room system offers architects a spatial structure with which they can address users' changing habits and patterns of inhabitation. As alternatives to open architecture, the free plan and free room still hold enormous potential to meet the architectural challenges of the coming decades.

Notes

1. Kisho Kurokawa, *Metabolism in Architecture* (London: Studio Vista, 1977), 10.
2. Herman Hertzberger, 'Open Systems', in *Structuralism Reloaded: Rule-Based Design in Architecture and Urbanism*, ed. Tomas Valena, Tom Avermaete and Georg Vrachliotis (London/Stuttgart: Edition Axel Menges, 2011), 170.
3. Herman Hertzberger, 'Transformation + Accommodation' (lecture, University of Seville, December 2015), 11, https://www.hertzberger.nl/images/nieuws/TransformationAccomodation2016.pdf.
4. Hertzberger, 'Transformation + Accommodation', 5.
5. Robert Kronenburg, *Flexible: Une architecture pour répondre au changement* (Paris: Norma Editions, 2007), 13. All translations from the French are by the author.
6. John Weeks, 'Indeterminate Architecture', *The Transactions of the Bartlett Society,* Volume 2 (London: Bartlett School of Architecture, 1964), 91.
7. N. John Habraken, 'Open Building as a Condition for Industrial Construction' (lecture published in the Proceedings of the 20th ISARC, Eindhoven, 2003), 37.
8. N. John Habraken, 'Open Building: Brief Introduction', https://www.habraken.com//html/introduction.htm/html/introduction.htm.
9. Stephen Kendall, 'Open Building Concepts', http://open-building.org/ob/concepts.html.
10. Kengo Kuma, Jun Sato and Akihisa Hirata, 'Beyond Deterministic Systems', *The Japan Architect* no. 83 (Autumn 2011): 4.
11. In 2011, the September issue of OASE magazine addressed this issue of uncertainty in architecture, and thus by extrapolation of indeterminacy. The editors of the issue argued that in the context of continuing economic instability since the 2008 financial crisis, rapidly changing political, social and economic parameters have had a negative effect on architectural design, which is usually created for the long term. See Klaske Havik, Véronique Patteeuw and Hans Teerds, 'Editorial, Productive Uncertainty/Indeterminacy in Spatial Design, Planning and Management', *OASE* no. 85 (2011): 3–5.
12. Jacques Lucan, 'Fundstücke: Aneignung der Natur – über die äussere Erscheinung hinaus', *Werk, bauen + wohnen* no.10 (2005): 4–7.
13. In agreement with Royston Landau's interpretation, Jorge Mejia Hernandez indicates that at the level of formal heuristics, the instruments and methods employed operate in at least four well-known areas of architectural exploration, evaluation and discovery: geometry, patterns, configurations and the processes that occur in forms. Jorge Mejia Hernandez, 'Transactions; or Architecture as a System of Research Programs' (PhD dissertation, TU Delft, 2018), 91.
14. Jean-Nicolas-Louis Durand, *Précis des leçons données à l'Ecole polytechnique* (Paris, 1802), foreword, VI.
15. Julien Guadet in the foreword to Henry Guesdy, *L'Enseignement à l'Ecole nationale et spéciale des beaux-arts – section d'architecture* (Paris, 1899), III.
16. Max Risselada, 'Introduction', in *Raumplan versus Plan Libre: Adolf Loos and Le Corbusier, 1919–1930,* ed. Max Risselada (New York : Rizzoli, 1988), 6.
17. Max Risselada, 'Documentation of 16 houses', ibid., 78.
18. Adolf Loos, 'Obituary for Josef Veillich' quoted in Risselada, ibid.
19. Heinrich Kulka quoted in Risselada, ibid., 79.
20. Ibid.
21. Adolf Loos, 'The Principle of Cladding', trans. Francis R. Jones., ibid., 141. Original text 'Von der Sparsamkeit', compiled by Bohuslav Markalous from *Wohnungskultur* 2/3 (1924).
22. Oscar Hansen, 'La forme ouverte dans l'architecture – l'art du grand nombre', *Le Carré Bleu,* no. 1 (1961).
23. Le Corbusier and Pierre Jeanneret, 'Les cinq points d'une architecture nouvelle', 27 July 1927, typed text sent to Alfred Roth. This text is published as

a facsimile in *Assemblage* no. 4 (October 1987): 82–93.
24. Le Corbusier, *Précisions sur un état présent de l'architecture et de l'urbanisme* (Paris, 1994), 123.
25. Le Corbusier, 'Où en est l'architecture?', *L'Architecture vivante (*Autumn and Winter 1927): 24.
26. Georges Candilis, 'Proposition pour un habitat évolutif', *Le Carré Bleu,* no.2 (1959).
27. Ron Dulaney Sinclair, Somayeh Mousazadeh and Ghazaleh Safarzadeh, 'Agility, Adaptability + Appropriateness: Conceiving, Crafting and Constructing an Architecture of the 21st Century', *Enquiry: The ARCC Journal for Architectural Research* 9, no.1 (December 2012): 36–37.
28. Bernard Leupen, *Frame and Generic Space: A Study into the Changeable Dwelling Proceeding from the Permanent* (Rotterdam: 010 Publishers, 2006).
29. Sinclair, Mousazadeh and Safarzadeh, 'Agility', 37.
30. Rem Koolhaas, untitled lecture given at TU Delft on 10 April 1987, published in *Indesem 87*: *International Design Seminar (*Delft, 1988), 212, http://resolver.tudelft.nl/uuid:2550a76e-d049-4904-8936-eca8820e6ca4.
31. Rem Koolhaas, 'Bigness or the Problem of Large', in *S, M, L, XL,* ed. O.M.A., Rem Koolhaas and Bruce Mau (New York: The Monacelli Press), 501.
32. Rem Koolhaas, 'Typical Plan', in *S, M, L, XL,* 340.
33. Ibid, 342.
34. Ibid., 338.
35. Koolhaas, *Indesem 87,* 212.
36. Alejandro Zaera Polo, 'Finding Freedoms: Conversations with Rem Koolhaas', *El Croquis* no. 53 (1992): 16.
37. Le Corbusier's brief comment on Villa Garches's structural principle in *L'architecture vivante* (Spring/Summer 1929): 32.
38. Winy Maas, Jacob van Rijs and Nathalie de Vries, 'The Functionmixer', *El Croquis* no. 111 (2002): 26.
39. MVRDV, *Berlin Voids* project description, http://www.mvrdv.nl/projects/165/berlin-voids.
40. Ibid.
41. MVRDV, project description for the Dutch Pavilion for Expo 2000, *El Croquis* no. 111 (2002): 43.
42. MVRDV, project description for DNB Headquarters, Central Building, *El Croquis* no. 173 (2014): 208.
43. Antonio Negri and Michael Hardt, *Multitude: Guerre et démocratie à l'âge de l'Empire* (Paris: La Découverte, 2004), 132.
44. MVRDV, project description, http://www.mvrdv.nl/projects/158/expo-2000.
45. MVRDV, project description for the Dutch Pavilion for Expo 2000, *El Croquis*, no.111, 43.
46. Jacob Van Rijs interview, https://www.mvrdv.nl/projects/432/expo-pavilion-20.
47. Ibid.
48. Cristina Diaz Moreno and Efren Garcia Grinda, 'Redefining the Tools of Radicalism: In Conversation with Winy Maas, Jacob van Rijs and Nathalie de Vries', *El Croquis* no. 111 (2002): 14.
49. Rem Koolhaas, *Delirious New York* (New York: The Monacelli Press, 1978), 296.
50. Alison and Peter Smithson, 'The New Brutalism', *Architectural Design* no. 25 (January 1955): 1.
51. Office KGDVS, project description, http://officek-gdvs.com/projects/#office-184.
52. Nathaniel Cortlandt Curtis, *Architectural Composition* (Cleveland: J.H. Jansen, 1923), 104.
53. Louis I. Kahn, 'La pièce, la rue et le contrat humain', in *Silence et lumière: choix de conférences et d'entretiens 1955–1974,* ed. Louis I. Kahn, (Paris, Éditions du Linteau, 1996), 225.
54. Louis I. Kahn, 'L'Architecture', in *Silence et lumière*, 254–55.
55. Louis I. Kahn, 'L'ordre', in *Silence et lumière*, 19.
56. Robert Venturi, *Complexity and Contradiction in Architecture,* 2nd. ed. (New York: The Museum of Modern Art, 1977), 34.
57. Peter Cook, 'Indeterminacy – Relaxed Scene,' *Archigram* no. 8 (1968).
58. Alejandro Zaera, 'A conversation with Kazyuo Sejima and Ryue Nishizawa', *El Croquis* no. 77(I)+99 (2000), 15.
59. Ibid.

60. Hans Ulrich Obrist, Kazuyo Sejima and Ryue Nishizawa, *SANAA The Conversation Series* (Cologne: Verlag der Buchhandlung König, 2012), 13.
61. Cédric Schärer, 'Plan Neutre', *Matières* no. 6 (2003): 96.
62. See project description in Luis Fernandez Galiano, *Sanaa: Sejima & Nishizawa 1990–2017* (Madrid: Arquitectura Viva, 2016), 204.
63. Ibid., 206.
64. Venturi, *Complexity,* 34.
65. See project description in *El Croquis,* no. 77(I)+99, 289.
66. The choice of measurement is in line with the functional indeterminacy of the room evoked by Aldo Rossi and referred to by the architects. The Belgian architects refer to Rossi in an interview between Joachim Declerck and Office KGDVS, and insist, based on Aldo Rossi's description of a room, that it is 'a room with a table and a few chairs, with no particular destination. This room is beautiful because it is spacious and nicely proportioned. It frames the space'. This relationship to the circumscription of space is important to Office KGDVS, as is the attention to experience within defined spaces. 'Architecture Is Itself. Une conversation entre Joachim Declerck, Kersten Geers et David Van Severen', in *35m3 Installatie/Installation/Installation. Office Kersten Geers David Van Severen*, exhibition catalogue (Antwerp: 2005), 46. Rossi describes the room that Office KGDVS refers to in: Aldo Rossi, *A Scientific Autobiography* (Cambridge, MA: The MIT Press, 1981), 29.
67. Project description in *El Croquis* no. 185 (2016): 236.
68. Enrique Walker, 'A conversation with Kersten Geers and David Van Severen', in *El Croquis* no.185 (2016): 15.
69. Obituary for Josef Veillich quoted in *Raumplan versus Plan Libre*, ed. Max Risselada, ibid., 77.
70. See project description in *El Croquis*, no. 151 (2010): 122.
71. Ibid.
72. Bruno Marchand and Lorraine Beaudoin, eds., *Contextes : le logements contemporain en situation* (Lausanne: Epfl Press, 2021), 14–15.
73. Andrew Rabeneck, David Sheppard and Peter Town, 'Housing: Flexibility/Adaptability?', *Architectural Design* (February 1974): 86–87.
74. Kronenburg, *Flexible,* 16.
75. Jacques Lucan, *Habiter: ville et architecture* (Lausanne: Epfl Press, 2021), 387.
76. Ibid.
77. Quoted in Aurélie Toninato, 'Faire de la ville une salle polyvalente', *Tribune de Genvève* no. 7 (April 2021).
78. See project description for Unité(s) +, http://sophie-delhay-architecte.fr/portfolio/lov-2/.
79. Heinrich Kulka quoted in *Raumplan versus Plan Libre*, ed. Risselada, 79
80. 'Observatoire des bureaux. État des lieux 2016, 2017 et pipeline – Zoom sur la ZIR Louise', *perspective. brussels* no. 38 (June 2019): 75.

Biography

Xavier Van Rooyen graduated as an architect from the School of Architecture in Liège. He has practiced architecture with JDS/Julien de Smedt Architects and Pierre Hebbelinck, and then in his own office where he has developed several public commissions. He joined the Department of Architectural Design at the University of Liège as an assistant professor in 2012, where he developed his PhD with Jacques Lucan and Bernard Kormoss. His PhD project has a special research interest in the public realm and the theory of architecture in Western and non-Western contexts of the 1960s. His research examines architectural precedents, design attitudes, methods, and instruments, with the explicit ambition to construct a historiography of the structure of indeterminate architecture since the 1960s.