

PROPORTION AND SPACE

Draft discussion paper addressed to the Werkgroep Vrienden in Amsterdam on the occasion of the Van der Laan Stichting's planned visit to Sweden, 25-26 June 2009. Comment and criticism is invited.

1. *A very personal Introduction.*

Not only in this Introduction, but also in later sections, I shall include personal anecdotes. In doing so, I am following the example of Van der Laan himself, who constantly referred to his own life experiences, especially those of his childhood, in explaining the sources of his ideas. I believe in any case that the personal approach is not only justified but necessary, because proportion, as I shall argue, is an intensely personal matter. For Van der Laan it was an objective and intellectual question, but for me it is a subjective and emotional one.

Every artist one thinks of in the context of proportion – e.g. Mondrian, Le Corbusier, Mies van der Rohe, Van der Laan or Donald Judd – used proportion in a characteristically personal way, a way that expresses that artist's personality and life experience. Some of these, such as Le Corbusier and Van der Laan, based their proportions on some consciously worked-out mathematical system. The others I have named seem not to have done so: their beautifully proportioned works appear to have been entirely intuitive.

As frequently happens in life, a series of accidents led me to Dom Van der Laan; yet however hard I try I can't get him out of my system. Not only has he had a major influence on everything I have written since first meeting him in 1980, but the dialogue has had the character of an ongoing dispute. I have always felt compelled to quarrel with him as well as admire and celebrate him. He seemed to welcome this, preferring it to an unquestioning acceptance of his every word. Thus even during the translation of *De architectonische ruimte* I would constantly argue with some of his statements, asking: 'Do you really mean to say this?' or 'But how can you say that? It's not how things are'. All my writings about him contain implicit or explicit criticisms of aspects of his theory, while being at the same time utterly dependent on that theory.

This text is no exception. It continues the argument I put forward in my lecture 'After Van der Laan', given at the Heerlen conference organized by Paul Bradley for the Henry Moore Foundation in 2001. In that lecture I pointed out that Dom Hans himself invited others to develop and extend his theory after his death, and recognized the need for this. When the English edition of *Architectonic Space* was published in 1983, he wrote to me that the thread running through the book 'must be filled out and strengthened at every point, but that is not for me to do'.¹ Six years later, reflecting on the completion of both his theory and his extensions to the abbey at Vaals, he wrote that

¹ H van der Laan, letter to the author, 26.10.1983

nevertheless it still remained for others 'to do everything': 'blijft er eigenlijk voor anderen nog alles te doen'.²

Unlike the young Hans van der Laan, who grew up in an architectural milieu, I am the first - and so far I believe the only - architect member of my family. The only architect I heard of as a young child was the designer of our house, and he was mentioned in hushed tones; cheated out of his life-savings by the developer/builder, he had committed suicide. His example was held up to me as an awful warning when, aged ten in 1945, I declared my intention to become an architect. My determination overcame the objections, however, and in 1952 I became a student at the AA School, qualifying five years later.

The only justification of this personal anecdote is that those same years, 1945-1957, coincided with a great revival of interest in architectural proportion, one of the highlights of which was the publication of Le Corbusier's *Le Modulor* in 1950. As a student, I was swept up in this wave of enthusiasm, which has never left me, although from 1957 onwards the focus of architectural theory shifted away to other concerns. The first of these new concerns was architectural space: Bruno Zevi's *Architecture as Space* was published in English in 1957. My aim in this paper is to argue that architectural space, rather than supplanting proportion, must be seen as entirely bound up with it. The fusion of proportion and space constitutes the essential core common to all architecture, a core that remains unchanged despite the changing uses and meanings that may be attached to any particular building in the passage of time.³

As Van der Laan shows in *Architectonic Space*, the peculiar quality of architectonic space depends on proportion. In Lesson IV of the book he argues that this space is constituted by a proportion between the thickness of masses and their distance apart. A radical change to this theory came in his last years: a new approach, which he called *thematismos*, grew out of his discovery of the second '*morphotheek*' or form-bank. In this later theory, architectonic space is the product of proportions, not just between horizontal measures, but between all three dimensions of all the surrounding masses, together with the distances between them. Moreover, he gives a new prominence to the human body, likening the proportions of these masses to the body's characteristic postures: standing, sitting or lying.

I hope to develop further this concept of 'embodied proportion', relating it to recent philosophical and psychological theories of 'the embodied mind'.⁴ At the same time, I shall argue that the converse of Van der Laan's theory is also true: namely, that just as space depends on proportion, proportion depends equally on space. In other words, the foundation of what we call our 'sense of

² H van der Laan, letter to the author, 25.6.1989

³ R Padovan, *Proportion*, Spon, London, 1999, pp. 336-359

⁴ Eg: G Lakoff & M Johnson, *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought*, Basic Books, New York, NY, 1999.

proportion' is our awareness of our own body in its relation to the space around it. Traces of this idea can be found here and there in Van der Laan's own writings, notably in *Le nombre plastique*, Lesson VII.15, where he writes:

'All these measures [i.e., those of the plastic number] can be rediscovered in the articulations of the human body. This should not surprise us, since the disposition of the body was one of the starting points for the determination of the plastic number. For it was through this disposition that we distinguished the three typical directions, length, breadth and height, which forced us to express architectonic size in terms of a threefold relation to the linear unit.'⁵

He then proceeds, however, to relate the typical dimensions of the body and its various limbs to specific plastic measures. By doing so, he merely follows in a long tradition that runs at least from Vitruvius, through the Renaissance, to Le Corbusier's *modulor*. What I have in mind is something less explicitly mathematical. For me, the significant phrase in the passage just quoted is 'the three typical directions'. That is, we perceive the space around us differently according to our posture and action within it: as in front, behind, to either side, above or below. Each direction has for us a particular emotional content; we employ them metaphorically in everyday speech, as when we say 'I feel very "down" today; I didn't sleep well last night'. The best exposition I know of this connection between, the body, our emotions, and architecture is contained in *The Architecture of Humanism* by the English writer Geoffrey Scott (1914):

'Architecture, simply and immediately conceived, is a combination ... of spaces, masses and lines ... The spaces, masses and lines of architecture, as perceived, are appearances ... and these appearances are related to human functions. Through these spaces we can conceive ourselves to move; these masses are capable, like ourselves, of pressure and resistance; these lines, should we follow or describe them, might be our path and our gesture ... We have looked at the building and identified ourselves with its apparent state. *We have transcribed ourselves into terms of architecture* ... The whole of architecture is, in fact, unconsciously invested by us with human movement and human moods. Here, then, is a principle complementary to the one just stated. *We transcribe architecture into terms of ourselves.*'

2. *The RIBA Debate and the loss of faith in proportion.*

When Le Corbusier's *Le modulor* was published in 1950 it became an architectural best seller. When *Le nombre plastique*, in my opinion a far more profound investigation, came out in 1960, just ten years later, it hardly caused a ripple in the pond of architectural culture. Proportion was no longer a burning issue for most architects. In Britain the turning point was marked by a debate on proportion held at the RIBA (Royal Institute of British Architects) in June 1957 (coinciding with my final examinations at the AA). The motion, 'that systems of proportion make good design easier and bad design more difficult'

⁵ H van der Laan, *Le nombre plastique*, EJ Brill, Leiden, 1960, pp. 59-60.

was defeated by 60 votes to 48. In the journal *L'Architettura* its editor, Bruno Zevi, applauded this verdict as demonstrating that 'no one really believes any longer in proportion systems'. The debate is significant, I believe, not only because it signaled a major change of focus in architectural thinking, but also because the individual speeches contain important clues to common errors about proportion - errors that led to the loss of faith - as well as clues to how these errors might be remedied.

At first sight, the arguments put forward by the speakers for the motion seem weaker than those of their opponents, but a closer reading of the transcript suggests to me that they are equally worthy of study. The latter illustrate why most architects have lost interest in proportion in the past fifty years, but the former contain solid foundations upon which a sound theory of proportion might be rebuilt. I will start with the opposition, which had the easier task, since the motion itself was flawed. For as a speaker from the floor, DH McMorran, later objected,

'I fear that [this evening's meeting] may ... go down [to posterity] as being perhaps one of the woolliest evenings that we have ever spent here. The motion is a very difficult one to speak to, because it contains quite a wrong and useless statement of the case in question ... To suppose that anything in this world makes good design easier is quite fallacious.'⁶

Thus the designer Misha Black, leading the opposition, accuses the proposers of lack of conviction: 'if conviction is diluted to something which makes good design easier (as though design were a safe which could be cracked with the help of a system of numbers), then we have so little left of the original theory as not to warrant your support.'⁷ It is hard to disagree; but the lesson I draw from this verdict is that systems of numbers (including the plastic number) are at best marginal to the real experience of proportion, which has to do with what Geoffrey Scott called 'human functions, human movement and human moods'.

To Van der Laan's credit, he at least refused to regard the plastic number as a means of making design easier; in fact he turned this on its head, insisting that, so far from the plastic number being merely a means, it is truer to describe it as the purpose, of making good architecture.⁸ So in a sense the embodiment of a proportion system *adds* to the problems of design.

Nevertheless, I cannot accept that the embodiment of the plastic number, or of any proportion system, is the purpose of architecture. Mathematical systems are not, for me, the goal, just an important ingredient. They serve a purpose at the initial sketch stage of the design process, in providing a

⁶ *RIBA Journal*, London, September 1957, p. 462

⁷ *RIBA Journal*, London, September 1957, p. 459

⁸ H van der Laan, *Le nombre plastique*, EJ Brill, Leiden, 1960, p. 109, and letter to RP, 26 October 1983.

conceptual framework, which we to abandon later as the real design takes shape in the unconscious mind.

Seconding the opposition, Peter Smithson, the leader of New Brutalism, eloquently described most of the then (and still) current misconceptions about proportion, and by accepting these misconceptions at face value, he claimed to prove the case against proportion systems as such. His speech is therefore even more instructive than Black's, in highlighting many of the pitfalls that any valid theory of proportion must avoid. These are:

1. The belief, which underlay much of the faith in systems in the period 1945-57, in an intimate connection, through modular coordination, between systems of proportion and industrialized building. Le Corbusier's claims in *Le modulor* are a classic example of this idea.
2. 'Architecture exists in space and not on the flat. Now, most systems of proportion are concerned with relating two dimensions ... In reality, architecture does not exist in the flat, but exists as a system of relationships ... in space ...'⁹
3. The designed proportions are distorted by perspective.
4. Our perception is built on (and by implication distorted by) 'visual memory and additive influences'. Experience is never direct, always 'loaded'. 'One does not record in an instant an actual thing.'¹⁰

These are all strong objections, but like Misha Black's, they are condemnations of current false assumptions about proportion systems, not of proportion as such. I reply to them in the same order:

1. In fact, there is no such connection. The aims of the building components manufacturer and of the architect concerned with proportion are mutually opposed. The manufacturer wants to minimize the number of standard measures while offering the user unlimited choice in their arrangement, whereas the architect wants to limit choice of arrangement in order to ensure aesthetic unity, while demanding a maximal range of standard measures, from small details to overall dimensions.
2. The second objection is based on the common failure to distinguish *proportion* from *ratio*. This important distinction was already made by Euclid in the fifth of his twelve books of *Elements*. Euclid defines *ratio* as 'a mutual relation of two magnitudes of the same kind' and *proportion* as 'the similitude of ratios. Proportion consists in three terms at least.'¹¹ A single rectangular plane, such as the plan or elevation of a building, is governed by a ratio. It is not yet a question of proportion. Proportion, as Euclid says, 'consists in three terms at least': for instance, the three dimensions of a spatial volume. It is the great merit

⁹ *RIBA Journal*, London, September 1957, p. 461.

¹⁰ *RIBA Journal*, London, September 1957, p. 462.

¹¹ *Euclid's Elements*, JM Dent, London, 1933, pp. 134-135.

of Van der Laan that he recognized that 'architectonic size [must be expressed] in terms of a threefold relation to the linear unit.'¹² I believe he was wrong, however, to conclude that because the key ratio of the plastic number is defined by a cubic equation it is uniquely three-dimensional, and therefore the only mathematical system appropriate to architecture. The relation between two dimensions is a ratio; it may define a rectangular figure. But the relation between two or more *ratios* is a proportion; it may define the shape of a volume, but it can equally define that between the two parts into which a larger plane figure is divided. Generally, many more than three dimensions are involved in such subdivisions: in the simple case of a rectangle divided in two parts, for instance, four dimensions are already concerned. Now, only proportions, I believe, not ratios, are complex enough to be aesthetically significant. This explains why the proportions of, say, Palladio's and Le Corbusier's buildings are equally admired, though based on quite different basic ratios. All ratios, and thus all *systems* are equally suited, in principle, to linear, planar or spatial proportion, irrespective of their defining equations. In this respect, the plastic number has no advantage over other systems. (This is clearly a view that members of the Stichting may hotly dispute, and I hope it generates a lively debate.)

3. Proportion is always a matter of complex relationships; the more complex, the richer. The laws of perspective are themselves laws of proportion.¹³ The increased complexity that arises when the measured dimensions are overlaid by proportions arising from perspective enriches the viewer's experience, it does not destroy it.
4. This demands a similar answer to (3). The 'loading' of visual experience by memory, emotion, etc., enriches the experience of proportion, it does not destroy it.

The supporters of the motion, hamstrung by its misleading wording, could not match the easy rhetoric of their opponents. However, they, like some later speakers from the floor, made observations that contain important lessons for us today. I shall quote at length two that I find especially insightful. First, the pioneer modernist architect Maxwell Fry, introducing the motion, observed that

'When we look around us in the world we see and subconsciously absorb the forms and rhythms which we find, and we recognize and particularize certain forms as being beautiful ... and find that they have mathematical and geometrical relations that recur. Reasoning as we do ... we find mathematical bases for what we call beauty. But even though we do, these forms remain untouched because we are merely indulging in some abstract reasoning. The systems of proportion are forms of abstraction, but they are nevertheless

¹² H van der Laan, *Le nombre plastique*, EJ Brill, Leiden, 1960, pp. 59-60.

¹³ R Padovan, *Proportion*, Spon, London, 1999, pp. 214-219.

useful. The natural forms are ... untouched ... but we are touched, because we have thereby been enabled to look more closely and feel more deeply.¹⁴

This observation echoes the wise warning of Sir Theodore Cook in his groundbreaking work of 1914, *The Curves of Life*:

'Because we can draw a spiral line through a series of developing members, it does not follow that a plant or a shell is attempting to make a spiral, or that a spiral would be of any advantage to it. All spiral appearances should properly be considered as subjective; and confirmation of this view ... is shown by the fact that the effect of a spiral becomes secondarily corrected as soon as it becomes a distinct disadvantage to the plant ... Geometrical constructions do not, in fact, give any clue to the causes which produce them, but only *express* what is seen.'¹⁵

In other words, we *project onto nature* our mathematical equations and constructions in order better to comprehend it. They do not correspond exactly to the 'thing-in-itself', but offer us an abstract substitute that serves our analytical purpose. The same happens, I believe, when we study the proportions of buildings and other works of art. It is notoriously easy to cast an arbitrary mathematical network over some ancient monument, such as the Great Pyramid or the Parthenon, and congratulate ourselves that it 'fits' with remarkable accuracy. It doesn't matter whether this network is based on the golden section, the plastic number (which Van der Laan applied to Stonehenge and other monuments) or some other system; with a little manipulation, they can all be made to fit equally well. This is not to say that such exercises are entirely invalid; I have myself indulged in them in my book *Proportion*. But it does mean, as Cook points out, that they are 'subjective'. They tell us, not what the artist intended, but merely *how we see the object*. Every observation is a re-creation.

Another interesting contribution came from the eminent architectural historian John Summerson, speaking from the floor. A month before, Summerson had delivered an important lecture at the RIBA, on 'The Case for a Theory of Modern Architecture'. In this he had argued that all architectural design must have a starting point, 'a source of unity' that holds the design together in the early stages of its development. In the past this was provided by historical precedent. Modernism, having jettisoned that traditional bulwark, has tried to find a substitute in the programme of functional requirements: 'The programme as the source of unity is, so far as I can see, the one new principle involved in modern architecture'.¹⁶

¹⁴ *RIBA Journal*, London, September 1957, pp. 457-458.

¹⁵ TA Cook, *The Curves of Life*, Dover Publications, New York, NY, 1979, p. 23.

¹⁶ *RIBA Journal*, London, June 1957, p. 309.

It cannot, however, be an adequate principle because, Summerson argues, any functional programme contains a number of variables, which until the design process is completed remain in a fluid state. Somehow, they must crystallize into a comprehensible whole, and how to achieve this without some such starting point as was formerly provided by historical example, or possibly a system of numerical or geometrical ordering, is unclear. Speaking in the debate a month later, Summerson seems to be alluding again to this problem. Citing the example of the architect Sir Edwin Lutyens, who like Le Corbusier (and Dom Van der Laan) developed and used a unique system of proportion of his own, he reflects that

'That is an interesting ... case of a man who needed and enjoyed a system of proportion, and that ... seems to show that the whole subject should be investigated on the plane of the psychology of design. That puts it on a plane so different and so remote, with so little data attached to it, that we simply cannot deal with it. There is a long tradition of divine proportion which can be elucidated to some extent historically, but what we probably need is an elucidation from the other end, the psychological end. If we think of Lutyens and Le Corbusier, there are two architects of quite phenomenal powers of invention ... Alas, we do not really know what we mean when we say "powers of invention" ... I do not think we can explain the matter any further until we have a much greater command of what invention means, what design means, what the whole psychology of design consists of.'¹⁷

I agree with Summerson that the psychological question, which as he admits has 'so little data attached to it', is nevertheless the principal key to the mystery of proportion. Though he doesn't say it in so many words, I infer that by 'psychology' he means principally the psychology of the unconscious mind; that is why data is lacking. If my inference is correct, then both Summerson and Fry both allude to the unconscious (or 'subconscious'). Rushing in, perhaps, like the fool, 'where angels fear to tread', I shall try to explore this inference further in the following two sections.

3. *All perception is creation.*

For twenty years, from my graduation at the AA in 1957 to 1977 when Van der Laan's *De architectonische ruimte* was published, I shared the general disillusion with proportion systems highlighted by the RIBA debate. I couldn't shed a kind of guilty interest in them, and even continued secretly to use some kind of system in my work, but could find no theoretical justification for doing this. The guilty fascination led me to Van der Laan. From his 1972 article in *Plan*¹⁸ I learnt that he had discovered and employed a new system. This attracted me, despite warnings from some Dutch architect friends to steer clear of 'that mad monk with his crazy number system'. So I read the

¹⁷ *RIBA Journal*, London, September 1957, p. 463.

¹⁸ *Plan* 6, June 1972, pp. 54-59.

book when it came out, and eventually reviewed it in *Architectural Design*. As a result of the review, Van der Laan invited me to Vaals to discuss an English translation. The moment I saw the abbey church I was overcome by its powerful architectural impact, and knew that this impact was due largely to proportion. All my doubts about proportion systems were instantly removed. I am struck by the same strong emotion each time I revisit the church.

Now although, having read the book, I already knew the plastic number measures in theory, they played no conscious part in my perception of the proportions. I can only attribute this perception to an unconscious process so rapid as to seem instantaneous. To analyze the proportions consciously would take a long time, and is perhaps only possible with the aid of scale drawings. What one perceives is not a series of related but discrete mathematical ratios but a far more complex whole, which includes the effect of perspective mentioned by Peter Smithson in the debate. There is a mystery, well described by François Molnar in his essay 'The Unit and the Whole':

'When I stand before a picture, I perceive it at a glance, globally, as a picture ... [But] the mathematical beauty of a work of art is not perceptible immediately but only after long reflection, and furthermore, without mathematical knowledge it is not perceptible at all ... One's aesthetic pleasure fades during that brief lapse of time the psychologists call "the density of the present". What goes on in our head in that fraction of a second, we scarcely know.'¹⁹

If the perception of proportion is, as it seems to be, a largely unconscious process, it is by definition inaccessible to conscious thought. We are aware of it only from its results. Moreover, the psychology of the unconscious mind is well beyond my expertise, since I am neither a psychologist nor a philosopher. Almost all the ideas I shall put forward in this and the following section are therefore derived from the writings of others, generally writings aimed at general readers like myself. The only original contribution I can claim is to have drawn connections between the separate ideas, and between them and the problem of architectural proportion.

To the same collection that contains Molnar's essay, the gestalt psychologist and art theorist Rudolf Arnheim contributed an important critique of Le Corbusier's *The Modulor*, originally published when the English edition came out in 1955. Although almost wholly speculative, as was probably inevitable at that date, the following passage provides valuable clues towards a possible solution, so I quote it at length. Arnheim writes that

'... rather than assuming a mere imposition upon perception on the part of the central powers of personality, it seems suitable to think of one and the same principle functioning at various psychical and physical levels throughout the organism. Balance, which is the root of the sense of proportion, would seem

¹⁹ F Molnar, 'The Unit and the Whole', in G Kepes (ed.), *Module, Symmetry, Proportion*, Studio Vista, London, 1966, pp. 204-217.

to be such a principle ... I shall assume that an optical pattern when projected upon the pertinent cortical field of the brain will there produce a corresponding configuration of forces. The static pattern will thus be translated into a dynamic process governed by the principle of balance, and the resulting tensions in the physiological field will have their counterpart in visual experience. This theory explains how we can judge spatial relations without measuring the lines or planes involved. Intuitive judgment, based simply on the inspection of the pattern as a whole, is assumed to rely on the strength and directions of the tensions experienced in the perceived object. Such intuitive judgment can be most sensitive even to compositions of geometrically or numerically complicated structure because instead of piecemeal figuring out the single elements and their connections the mind can rely on the tensions resulting from the integrated action of all the forces concerned. More generally, this means that whereas the calculating mind can only approximate the Gestalt by establishing a network of relations, the perceiving mind can fully realize it by relying on the field of interacting forces itself.'²⁰

Now, if this intuitive or even instinctive process, or something like it, occurs in the *perception* of proportion, what can this tell us about the *creation* of a proportional scheme? This time I take my clue from a short lecture, 'The Creative Act', given by the artist Marcel Duchamp in 1957, just two years after Arnheim's essay. I quote the most relevant passages:

'To all appearances, the artist acts like a mediumistic being who ... seeks his way out of a clearing. If we give the attributes of a medium to the artist, we must then deny him the state of consciousness on the aesthetic plane about what he is doing or why he is doing it. All his decisions in the artistic execution of the work rest with pure intuition and cannot be translated into a self-analysis, spoken or written, or even thought out ... I know that this statement will not meet with the approval of many artists who refuse this mediumistic role and insist on the validity of their awareness in the creative act – yet, art history has consistently decided upon the virtues of a work of art through considerations completely divorced from the rationalized explanations of the artist ... All in all, the creative act is not performed by the artist alone; the spectator brings the work in contact with the external world by deciphering and interpreting its inner qualifications and thus adds his contribution to the creative act. This becomes even more obvious when posterity gives its final verdict and sometimes rehabilitates forgotten artists.'²¹

The only word I would change in that passage is 'final' in the last sentence. The process of creating and re-creating a work of art is in my opinion never-ending. There is no final verdict.

²⁰ R Arnheim, 'A Review of Proportion', in G Kepes (ed.), *Module, Symmetry, Proportion*, Studio Vista, London, 1966, pp. 204-217.

²¹ M Duchamp, 'The Creative Act', reprinted in C Tomkins, *Duchamp*, Henry Holt, New York, NY, 1996, pp. 509-510.

Duchamp's argument seems to anticipate the principle of Deconstruction (as first formulated in literary theory and philosophy, not as later travestied in architecture). A gulf appears at each stage of the everlasting creative process. The object created is not the same as the initial conscious idea in the artist's mind; and when the artist later views the finished work her perception of it differs in turn from the work 'in-itself', for now the artist too takes on the role of spectator. This explains why, when one sees a completed building that one has designed it always comes as something of a surprise, pleasant or unpleasant. There's so much in it that one hadn't consciously anticipated.

The 'gulf' that appears is that between the material artefact, existing 'outside' us in the objective world, and a mind: initially the mind of the maker and subsequently that of a perceiver. The gulf is closed, I believe, by a hidden - because unconscious - creative process. We call the initial process 'creation' and the others 'perception', but as Duchamp observes, they are all equally creative acts.

However, this properly describes the creative process only when the artefact is made by the artist's own hand, allowing an unbroken correlation between hand and brain, as for instance happens in painting. In architecture and the other arts of design, where the designer produces scale drawings to be executed by others, the unconscious process must be interrupted and brought into consciousness at an earlier point, if only in order to determine precise measures. As van der Laan says in the opening words of *Le nombre plastique*,

'L'architecte ... est un homme sans cesse occupé de mesures et de nombres. Ses dessins sont couverts de chiffres, et la règle gradué est toujours à portée de sa main.'

In these cases, the unconscious creative process still takes place, I suggest, but it is terminated before the material object is made. The architect's freehand sketches are still a spontaneous expression of an intuitive creative act, but in the further development of these sketches conscious reasoning must be brought into play. Van der Laan's fellow student the architect SJ van Embden recounts in his Preface to the English edition of *Architectonic Space* that Gerrit Rietveld, in conversation with Van der Laan,

'... once acknowledged that in his designs he at first sketched out measures and proportions freehand, but then chose the smallest measure as the module for all the others. He knew, he added, that in this way the design would achieve greater clarity, even if at the cost of quality.'²²

²² SJ van Embden, Preface to H van der Laan, *Architectonic Space*, EJ Brill, Leiden, 1983, p. VIII.

4. *The complementary roles of the unconscious and of consciousness in perception and creation.*

Because unconscious mental processes are by definition inaccessible to consciousness, we become aware of them mainly by their results. Something has happened that (if like me you reject 'divine inspiration' or some such outside influence) can be due only to an unconscious, instinctive operation of our own brain. Most such events are everyday occurrences that we take for granted. In his book *Consciousness* the psychologist Jeffrey Gray observes that many of our decisions to act are made before we are conscious of making them. In championship tennis, for example, the service is so fast that one must position oneself and return the ball before becoming conscious of it even leaving the server's racket. Outside sport, many of our everyday physical actions are unconscious in the same way. Familiar examples are walking over rough ground, or along a busy pavement avoiding oncoming pedestrians; or driving a car while holding a conversation with a passenger. In all such cases, we only become conscious of what we are doing when some incident or obstacle forces it to the surface.

The same applies to much of our 'purely mental', as opposed to physical, activity. I put 'purely mental' in quotes because in the following section I shall argue that body and brain are a continuum: we think with our whole body, not just with the brain, let alone a disembodied, purely spiritual 'mind'. Gray cites research by Max Velmans listing a number of everyday operations normally completed unconsciously before we are aware of carrying them out: 'analysis of sensory input; analysis of emotional content of input; phonological and semantic analysis of heard speech; semantic and phonological preparation of one's own spoken words and sentences; learning; the formation of memories; choice and preparation of voluntary acts; planning and execution of movements.'²³ George Lakoff and Mark Johnson argue in their thought-provoking book *Philosophy in the Flesh* that 'Thought is mainly unconscious':

'Conscious thought is the tip of an enormous iceberg. It is the rule of thumb among cognitive scientists that unconscious thought is 95 percent of all thought – and that may be a serious underestimate. Moreover, the 95 percent below the surface of conscious awareness shapes and structures all conscious thought. If the cognitive unconscious were not there doing this shaping, there would be no conscious thought.'²⁴

In my view, both the instantaneous perception of proportion referred to by François Molnar, and the creative process itself, are best accounted for in terms of this unconscious shaping and structuring. As soon as I began to

²³ J Gray, *Consciousness*, Oxford University Press, Oxford, 2004, p. 9; citation from M Velmans, 'Is human information processing conscious?', *Behavioral and Brain Sciences* 14, 1991, pp. 651-669.

²⁴ G Lakoff & M Johnson, *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought*, Basic Books, New York, NY, 1999, p. 13.

tackle design projects as a 17 year-old beginning student I was disconcerted to find that I would spend day after day agonizing consciously over the brief, vainly trying out all sorts of solutions to the multiple problems it posed. Whatever I tried, it would never 'gel' into a satisfactory whole. I'd end by getting totally frustrated and escape to a cinema or a museum. But it was just then, when I had given up hope, that the perfect solution (or perfect enough to seem so to me) would gush up into consciousness, almost complete in every detail, so all I had to do next day was draw it up. I say 'all', but there were sometimes a few corrections to be made. Nevertheless, it seemed a miracle: an 'inspiration'.

I now believe, as I say, that this was due not to any inspiration from outside but to an unconscious process, and that only the unconscious mind can resolve large numbers of variables into a unified solution. Every architectural design involves a multiplicity of at first apparently unconnected and often mutually conflicting functional and aesthetic problems: a site, a climate, the user's needs, diverse structural and constructional options, a wide range of alternative materials, a budget, and so on (not to mention proportion). Conscious reasoning can deal with at most two elements at a time; as soon as a third is introduced, the relation achieved between the first two is disrupted. Only the unconscious, it seems, can survey the field as a whole, and as Rudolf Arnheim says, 'instead of piecemeal figuring out the single elements and their connections ... rely on the tensions resulting from the integrated action of all the forces concerned'.

I suggest that what applies to the design problem as a whole applies also to the question of proportion regarded separately. Conscious reasoning can relate together two elements at a time, such as the two dimensions that determine the shape of a single rectangle. But only the unconscious mind can grasp and handle the complex three-dimensional and perspectival relations that arise when we see even a fairly simple building.

When I discussed my student experience with my father, who was a keen reader of scientific and mathematical literature, he drew to my attention the chapter on 'Mathematical Discovery' in *Science and Method*, a book published in 1908 by the great French mathematician and philosopher of science Henri Poincaré (1854-1912). Reading it, I discovered that what I had experienced was not peculiar to me or confined to artistic creation alone; it also happened in other fields, such as mathematical and scientific discovery.

Poincaré relates how, not long after completing his doctorate, he was struggling with the formulation of a complex theorem. At each stage, the solution evaded him until by choice or force of outside circumstances he had laid the problem temporarily aside. Then, unexpectedly, the solution came to him in a rush of illumination: on one occasion while traveling to a conference; on another, during his military service; on a third, when he had decided to put aside the fruitless work and spend a few days by the sea. Each time, it came

with the same conciseness, suddenness and feeling of certainty.²⁵ (A more famous example of sudden mathematical illumination is Archimedes' so-called 'Eureka experience'.)

Poincaré concludes that such illuminations must be the result of a long process of previous unconscious work. To account for the high proportion of occasions on which the solution, when afterwards checked, proved correct, he offers two alternative hypotheses: either the unconscious mind is superior to conscious reasoning, being able not only to survey a huge number of possible answers but then to select with great discernment the correct one, or else it performs only the first of these two stages, and it is left to consciousness to make the final selection. Being a child of his time, Poincaré opts for the second explanation. He cannot bring himself to accept that consciousness may be less, not more, powerful than the unconscious. He speculates that the conscious mind employs an aesthetic sensibility to select the best from a multiplicity of possible solutions thrown up by the unconscious.

I find this latter argument quite unconvincing. If such a conscious process of selection took place, one would be *conscious* of it; but one is not. All one experiences consciously is the single, final illumination. I agree with Poincaré, however, that aesthetics plays a large part in the selection. In science and mathematics, as in art, the most beautiful solution is the most convincing. In the sixteenth century, when Copernicus proposed his heliocentric theory, it didn't yet explain the observed phenomena any more completely than the clumsy geocentric theory of Ptolemy; it was just simpler and more elegant.

Poincaré is surely correct, also, in his description of three distinct stages. The initial conscious struggle seems to be necessary in order to formulate the problem and to initiate the unconscious process. And the burst of illumination must be followed by a painstaking checking of all the data; because the unconscious mind, however powerful, is not infallible. In 1926, building on Poincaré's account and on earlier work by Hermann von Helmholtz and others, Graham Wallas in his book *The Art of Thought* added a further stage. He identified four phases in the process of problem solving, which have since been widely accepted by design theorists: *preparation, incubation, illumination and verification*.

Now, if the unconscious performs so important a role in both perception and creation, the question arises: at which stage, if any, does conscious application of a mathematical system of proportion, such as the plastic number, have a part to play in these processes? Or is it wholly irrelevant?

Concerning the perceptual stage, it is not too difficult to speculate. On my first visit to Vaals in 1980 I was instantly overwhelmed by a powerful *sense* of the proportions, but although having read Van der Laan's book I was more or less informed about the plastic number, I this knowledge played no part in that

²⁵ H Poincaré, *Science and Method*, in SJ Gould (ed.), *Henri Poincaré: The Value of Science*, The Modern Library, New York, NY, 2001, pp. 387-400.

experience. Only much later was I able, with the help of scale drawings and further research, to analyze the proportions consciously. And as Molnar observes, that analytical process was cool and unemotional compared with the powerful initial sensation. Whether my previous reading brought any enhancement to the initial unconscious experience, compared with that of a completely uninformed visitor, I cannot say.

The design process, with its three or four stages, is more complex. Is it an advantage for the designer to be armed with a system from the start? Or should a system be brought in, if at all, at the final stage of verification, as a corrective, in the manner of Rietveld? Or was the audience at the 1957 RIBA debate right to reject the motion that 'Systems of proportion make good design easier and bad design more difficult'? And finally, what were Van der Laan's own belief and practice?

One of Van der Laan's few sources were the *Ten Books* of Vitruvius, in the sixth of which the Roman author writes that

'There is nothing to which an architect should devote more thought than to the exact proportions of his building with reference to a certain part selected as the standard. After the standard of symmetry has been determined, and the proportionate dimensions adjusted by calculation, it is next the part of wisdom to consider the nature of the site, or questions of use or beauty, and modify the plan by diminutions or additions in such a manner that these ... may be seen to be made on correct principles ...'²⁶

Thus the proportional scheme is not just one of the first things thought about, alongside the various functional and technical aspects of the problem; it is decided *before considering any of the rest*. Even 'beauty' is regarded as separate from, and subordinate to, proportion. This pronouncement must ring strangely to most modern ears. A typical modern view is expressed in the following outburst from the Bauhaus artist and theatre director Oskar Schlemmer. Admittedly he is speaking of painting, not architecture:

'Experience has taught me that proportion and the basic laws signify something very noble in art, but also something very dangerous. It is utterly fatal to treat them as a convenient recipe or dogma, to invoke them before the picture itself has been visualized; instead of "freedom under law" one ends up with inspiration in handcuffs. No! The initial impulse should be emotion, the stream of unconscious, free, unfettered creation ... If mathematical proportions *are* called in, they should function as a regulative, first simply to

²⁶ Vitruvius, *The Ten Books on Architecture*, Dover Publications, New York, NY, 1960, p. 174.

confirm what instinct has created and then, proceeding from this confirmation, to establish new rules (which combine feeling and objective principles).²⁷

In contrast to most modernist architects, Le Corbusier held to the ancient view that a system of proportions was 'a necessary instrument' in the hands of the artist.²⁸ In *Vers une architecture* the chapter on 'Les tracées régulateurs' leaves no room for doubt that the geometrical *schema* plays an important part in his design process, as becomes still clearer in his later book *Le modulator*. However, the Canadian scholar Roger Herz-Fischler has made a detailed study of documents at the Fondation Le Corbusier relating to the evolving design for Le Corbusier's earlier works such as the Villa Stein at Garches (1927). From this he concludes that the actual process was far more tentative and experimental than the final published versions suggest:

'Le Corbusier did not hesitate to change his writings or drawings, to accommodate his constantly changing views and systems ... In particular, this is the case for Garches; as the various early documents and drawings indicate, Le Corbusier made no use of the golden number in his design ... In the first place, when considering the period that ends with Cook, Garches and Stuttgart, Le Corbusier's method of using regulating lines should not be considered as a formal system of design. Rather, Le Corbusier used regulating lines to make certain modifications and corrections in his plan or to verify and confirm them ... Secondly ... Le Corbusier did not feel that only one set of regulating lines would fit a given structure. Hence, a new set of regulating lines for a building would not be seen as a change, but rather as a new verification and confirmation of his original work.'²⁹

This conclusion gains support from Le Corbusier's own account in *Le modulator*. Illustrating his method by means of the elevations of the Villa Stein at Garches, together with some of his early paintings, he makes it clear in the accompanying text that the proportions did not come first, as Vitruvius advises, but were brought in later:

'The regulating lines are not, in principle, a preconceived plan; they are chosen in a particular form depending on the demands of the composition itself, already formulated, already well and truly in existence. The lines do no more than establish order and clarity on the level of geometrical equilibrium, achieving or claiming to achieve a veritable purification. The regulating lines

²⁷ O Schlemmer, diary entry, October 1930, in *The Letters and Diaries of Oskar Schlemmer*, Northwestern University Press, Evanston, Ill., 1990, pp. 271-272.

²⁸ Le Corbusier, *Towards a New Architecture*, The Architectural Press, London, 1946, p. 69.

²⁹ R Herz-Fischler, 'Le Corbusier's "Regulating Lines" for the Villa at Garches (1927) and Other Early Works', *Journal of the Society of Architectural Historians* 53-59, March 1984, pp. 53-59.

do not inspire the theme of the work; they are not creative; they merely establish a balance.³⁰

Thus Le Corbusier's practice, at least until he began to employ the *modulor* in his postwar work, seems to accord with Schlemmer's recommendation that systematic proportions should only 'function as a regulative, first simply to confirm what instinct has created and then, proceeding from this confirmation, to establish new rules'.

Van der Laan's practice, according to his own account, seems closer to that recommended by Vitruvius. He started out from the plastic number measures, which he compared to the harmonic scale in the mind of the musical composer embarking on the creation of a new piece. (I believe he derived the term 'le nombre plastique' from Dom Guéranger's title *Le nombre musicale*.) But like Vitruvius, he also recognized the need at the final stage to 'modify the plan by diminutions or additions in such a manner that these ... may be seen to be made on correct principles'. Thus in *Le nombre plastique* he writes of *rappports augmentés* and *rappports réduits*; the effect of the former, he says, is to give 'a slight exaggeration that brings a certain elegance to the proportions', whereas the effect of the latter is that the proportions become more sturdy.³¹ But although he writes that 'the perception of such nuances is purely a question of sensibility' they are not arbitrary but precisely calculated, as Vitruvius prescribes, according to rules inherent in the system.

It seems to me that the processes described by both Le Corbusier and Van der Laan have much to recommend them. It is hard to decide between them. Nevertheless, what happens during the unconscious process between the initial and terminal stages of 'preparation' and 'verification' (a process unmentioned and perhaps unrecognized by either architect) remains something of a mystery. It seems reasonable to speculate that if a designer has in mind a proportional *schema* from the start, at the conscious stage of 'preparation', it must be one of the many factors that the unconscious mind would work on and modify, together with such concerns as site, function, structure, construction and cost.

It is less obvious, however, how radical this modification might or should be. Is the proportional scheme that emerges to consciousness at the stage of 'illumination' still based on the original system (whether or not in a slightly 'nuanced' form) or is it changed more fundamentally, as indicated by the difference between Le Corbusier's early sketches and his final published drawings? On the whole, I am more convinced by Le Corbusier's earlier experimental method than by his later rigid adherence to the *modulor*. Likewise I must reject Van der Laan's dogmatic assertion that the plastic number is the only valid system for architecture. I agree with his teacher MJ

³⁰ Le Corbusier, *The Modulor*, Faber & Faber, London, 1961, pp. 34-35

³¹ H van der Laan, *Le nombre plastique*, EJ Brill, Leiden, 1960, pp. 106-107.

Granpré Molière's verdict that the plastic number is a valuable addition to the existing repertoire of possible proportion systems, but no more.

5. *Thinking with the body.*

I wrote in the Introduction that 'the foundation of what we call our 'sense of proportion' is our awareness of our own body in its relation to the space around it'. I want to end by developing that assertion.

It was the great strength of Van der Laan, I believe, to be able survey the total scope of things and to expound this wide view with the utmost clarity. Both *De architectonische ruimte* and his last book, *Het vormenspel der liturgie* are examples of this. In my first attempt to present his ideas in writing, the booklet *Dom Hans van der Laan and the Necessity of Limits* (1989), I described the former book as 'the most complete and coherent treatise on the nature, purpose and meaning of architecture that has ever been attempted'.³² I see no reason to change that assessment.

Het vormenspel is broader still, since it treats of the whole world: nature, human society and culture, liturgy and God Himself. Yet as the scope has grown wider, the books have become ever shorter and more compressed. However, the clarity that makes this compression possible is achieved, I believe, at the cost of an obsessive drive to articulate: to divide wholes into discrete parts, and to subdivide these again into sub-parts. Typically, there are first two parts, and then a third is brought in as intermediary to unite them. There is a certain resemblance to the methodology of Catholic theology, a salient example being the doctrine of the Holy Trinity. Was it a habit of thought acquired in Van der Laan's training for the priesthood, I wonder?

The clear categories that Van der Laan presents are in my opinion an artificial construction. They aid clear exposition, but obscure the real continuity of things. What is really a continuum is broken down and re-presented in the form of ingenious three-part patterns, each pattern reflected in another, giving an illusion of unity that I would compare to the way a kaleidoscope gives an illusion of symmetry to a few scattered fragments of coloured glass.

In *De architectonische ruimte* this tendency shows itself in Van der Laan's treatment of space, form and measure. He begins excellently, by showing how architecture arises from our need to harmonize our relation to the space around us:

'The ground being too hard for our bare feet we make ourselves sandals of softer material than the ground, but tougher than our feet ... With the house it

³² R Padovan, *Dom Hans van der Laan and the Necessity of Limits*, Stichting Manutius, Maastricht, 1989, p. 4.

is a matter not just of contact between our feet and the ground, but of the meeting of our whole being with the total natural environment.'³³

Thus both 'our whole being' and 'the total natural environment' are at first presented as homogeneous unities. But almost at once, Van der Laan breaks down these unities into separate compartments or 'levels'. Unlike a stick or a stone, he says, 'an animate existence that shows itself in spontaneous movement needs a shelter that leaves over enough space for moving about in. And movement is guided by the senses ...; lastly, the intellect must freely direct towards their goal both the movement of the body and the working of the senses.'³⁴

I cannot help seeing in this an example of Cartesian dualism, mitigated by introducing an intermediate level – 'sensory perception' - between the two extremes of 'physical experience' and 'intellectual insight'. Corresponding to these distinct levels of our own being, the natural environment too is given three levels: the level of physical matter and space, the level of form and the level of quantity. Through our bodies we belong to the first, through our senses we apprehend the second, while only our intellect is able to grasp the third and highest level. The following passage from the sixth lesson illustrates Van der Laan's method of reasoning by numerical analogy:

'The three functions of the house at the different levels of experience, perception and insight are able to fuse together into the great function of completing nature because between each pair of these functions appears a secondary form of the great dyad art-nature, and because furthermore the middle function, that of form, on one hand completes the function of space and on the other is itself completed by that of quantity. At each separate level of architectonic functionality there arises only a single secondary dyad, but it is through the interrelation of these dyads that the great dyad art-nature is realized.'³⁵

Here I must lay my cards on the table and admit a bias, which perhaps lies at the heart of my need to quarrel with Van der Laan. Although brought up, like him, in the Catholic faith I rejected it at an early age, declaring myself an atheist. I was fascinated, therefore, when I rose to the higher classes at my Catholic school, where 'Apologetics', the alleged proofs of Catholic doctrine, replaced 'Catechism' in our religious education. Apologetics did nothing to divert me from my already established atheism, but it interested me so much that I asked many questions in the lessons and scored 100% in the examination. From Apologetics I learnt that atheism comes in three flavours: materialism, agnosticism and pantheism. Asking myself which kind of atheist I was, I found pantheism the most congenial. Materialism seemed incomplete, and agnosticism just a way of sitting on the fence. Through pantheism I found

³³ H van der Laan, *Architectonic Space*, EJ Brill, Leiden, 1983, p. 1.

³⁴ H van der Laan, *Architectonic Space*, EJ Brill, Leiden, 1983, p. 4.

³⁵ H van der Laan, *Architectonic Space*, EJ Brill, Leiden, 1983, pp. 61-62.

my way to the *Ethics* of Spinoza, which, with a certain tempering by later, more skeptical philosophers such as Hume, Kant and Schopenhauer, I have adhered to ever since as best representing my view of the world.

The consequence is that I reject Descartes' dualism of mind and matter, even if mediated by something vaguely called 'sense'. I see mind and matter (Spinoza's 'thought' and 'extension') as attributes of a single substance, 'God-or-nature'. That we perceive them as separate is merely the result of our limited human perspective. In much the same way, we see the sun as 'rising' each morning, while we stay still, though we know that this is not the case.

Consequently, I cannot separate mind and body. The disembodied mind that might emerge from a brain removed from the body at birth and suspended in a vat in a laboratory would, I suspect, be quite different from the embodied mind that emerges from an embodied brain, because it would lack our normal life-experiences, and would not have acquired even a fictitious memory of body-awareness.

We think, not with our brain alone but with our body as a whole. Even our abstract reasoning relies on metaphors borrowed from physical sensation and experience: we make constant use of such oppositions as 'superior/inferior', 'progress/regress', 'remote/close', 'extrovert/introvert' etc. And if that is true of our abstract thought, how much more obviously true is it of our thinking about space and matter: the air we breath and in which we move about, and the earth that supports our weight and which supplies our food and our other material needs?

Therefore I see Van der Laan's three distinct 'levels' as arbitrary subdivisions of a continuum. Where he presents our 'physical experience of space' as merely a relation between an animated lump of matter and a space extending over the surface of the earth, I see it as inseparable from our sensory perception of that space and that surface, and I see perception in turn as inseparable from our thoughts and feelings about space. Conversely, where Van der Laan sees our 'intellectual insight into quantity' as an affair of pure intellection, I see it as inseparable from our constant awareness of our body, with its three orientations (vertical, forward/back and left/right), its characteristic measures and its countable digits and limbs. In this I go back (as he himself does) to Vitruvius, and no doubt to the Greek theorists who were his sources. Thus Vitruvius states that 'It was from the members of the body that they [our forefathers] derived the fundamental idea of the measures which are obviously necessary in all our works, as the finger, palm, foot, and cubit.'³⁶

Lastly, I find it absurd to suggest that the senses constitute a discrete faculty, distinct from either the body or the mind. We do not 'see with our eyes' or 'hear with our ears'. Our sense organs are extensions of the brain to points on

³⁶ Vitruvius, *The Ten Books on Architecture*, Dover Publicatons, New York, NY, 1960, p. 73.

or near the body's surface. The actual processes of perception – the construction of coherent images of the external world - take place in specialized areas of the brain. They are no less 'mental' than our other 'intellectual' functions.

In his last, extraordinarily productive years, Van der Laan seemed to be striving towards a more unified concept of architecture in its relation to the human body and its natural environment, and of the inseparable bond between proportion, the body and space. Writing to me in March 1987, he observed that just as the first chapter of *Architectonic Space*, called 'Nature and Architecture', seeks to present architecture in its most general aspect, he should have ended the book by gathering up all the threads once more in a single unified perspective. The title of that final chapter might have been 'Architecture and Nature', reversing the order of the first, because in this new, deeper perspective architecture, which began by being removed from natural space as an enclosed 'inside space' marked off from the natural 'outside', is now returned to it:

'For by the placing together of building volumes I now come into direct contact with the space of nature, and as it were make natural space, by a certain play of its dimensions, visible between these volumes ... You see the deeper perspective in which I now view architecture.'³⁷

This new perspective was revealed to him by his discovery of a new 'necessary instrument', replacing the earlier 'morphotheek' that categorized forms according to the relations between their three dimensions, by successively enlarging one of these dimensions at a time. Now, all three dimensions of each form are changed while keeping its volume constant:

'The previous morphotheek served to illustrate eurhythmy, which involved the proportions between the height, length and breadth of each form separately; now it is a matter of the relations between forms as such: between blocks, bars and slabs.'³⁸

At the conclusion of his article 'Instruments of Order', written two years later, Van der Laan develops this idea:

'In nature, forms become more distinct the more they raise themselves above the earth's surface, to which they are bound by gravity. To mark the place where he had his dream, Jakob raised up the flat stone that had served as his pillow. Between the lying of the flat form and the standing of an upright one there exists a continuous series of possibilities, which, recalling our own bodies, we classify as lying, sitting and standing forms. Which category the form belongs to depends on its eurhythmy [i.e. the relation between its three dimensions] ... Now, however, it is no longer a matter of changing the form by

³⁷ H van der Laan, letter to RP, 18 March 1987.

³⁸ H van der Laan, letter to RP, 18 March 1987.

lengthening or shortening one of its dimensions, but of *transforming* it while maintaining its volume constant ... When these forms are placed in each other's neighbourhood, a new relationship arises between them, a sort of super-eurhythmy, for which the Greeks used the word *thematismos*: the ordered arrangement of different forms ... We now impose our standing, sitting or lying posture upon the things themselves, in this case upon buildings, which rise up, as towers, houses and galleries, within the space of nature. By this means we confer upon the primary given – the exclusively vertical orientation of natural space above the earth – a three-dimensional intensity.³⁹

For me, the two principal advances achieved by the new insight are: first, the implied recognition that the foundation of architectonic space/proportion is the body with its posture, gesture and movement; and second, the abandonment of the walled-in space with closed corners in favour of the placing together of building volumes in direct contact with natural space, which, no longer shut out as an 'outside', is allowed, 'by a certain play of its dimensions,' to become 'visible between these volumes'.

Much work is needed to complete this radical development of the theory, which Van der Laan embarked on only in the last years of his life. But as I complained in my 2001 Heerlen lecture, evidence is rather scarce of further progress in investigating 'how the theory of architectonic space initiated by Pater Van der Laan might develop in the future, or what kind of architecture might arise from that development'. The greatness of his achievement makes one fear to lose everything by disturbing it, as though by removing one stone from the edifice one risks bringing down the whole structure. But I think we must take that risk, because it is at least equally dangerous, as I said, 'to cling limpet-like to the rock of his doctrine, not daring to move in any direction'.⁴⁰ A theory that has ceased to evolve is a dead theory, just as a tree that no longer sheds its leaves and puts out new ones is a dead tree. Van der Laan recognized this, observing that 'vernieuwingen noodzakelijk met bepaalde vernielingen gepaard gaan.'⁴¹

Richard Padovan 02.10.08.

³⁹ H van der Laan, 'Instruments of Order', 7 April 1989.

⁴⁰ R Padovan, 'After Van der Laan', lecture, Stadhal, Heerlen, 26 October 2001, in *The Line Under the Spell of its Measure*, ed. Paul Bradley, Henry Moore Foundation, Leeds, p. 45.

⁴¹ H van der Laan, 'Discussie over de betekenis van Granpré Molière', *Plan 6*, 1972, p. 28.