

The Merging of Proportion Theory, Morphology and 'National' Imagery in Fifties Modern Architecture: the Pietilä Pavilion at Expo 58

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Up till now, the Architecture of Expo 58 seems to have escaped the historian's attention.¹ In contrast to this lack of interest, but also on the origin of it, is—ironically—its popularity. The collective memory of the Belgian people and of architecture critics seems to be marked by nostalgia for the *Atomic Style*, a mix of contemporary frivolity and popular trivia, which dominated the look of Expo 58. This rip off 'modernism', with its easily accessible proto-*Pop* features has led to a limited historical reputation and even disapproval² of the architecture of this first post-war World's Fair. The theme of the fair, *Balance-sheet of the World for a more Humane World*, has fed the naive image of Expo 58. Its rhetoric was inspired by a longing for a new Humanism, a glorious future world in which the seemingly endless possibilities of the new sciences would benefit the daily life of Men. The promotion of science encouraged architects to experiment on a vast scale with the latest construction techniques and materials, such as hanging roofs, hyperboloid constructions, prestressed concrete or plastics. Prophesised as an architecture that would be twenty years ahead of its time, these high-tech gestures turned the expo site into a festival of structure and, once again, reinforced the utopian message of a peaceful science-dominated future.

Contrary to the general souvenir, the architecture of Expo 58 was not at all a homogeneous illustration of a so-called gay *Atomic Style* and unchallenged optimism. The utopian atmosphere of the World's Fair was partially countered by the then twofold cultural-intellectual climate, which revealed a Jekyll&Hyde-like image of modern technologies. These tendencies can also be traced in the different approaches that modern architecture was dealt with at the fair. As an illustration of

this thesis, the presented paper focuses on the interdisciplinary influences on, and new impulses within the post-war Finnish modern movement and the way the debuting architect Reima Pietilä (1923-1995) translated them in his pavilion for the Brussels Expo 58. The research at the basis of this text is part of an ongoing Ph.D. project that aims to explore the Architecture of Expo 58, its meaning in the post-war Belgian architectural climate and its relevance in an international context.

Recent study has revealed the quality of several pavilions of the Foreign Section of the expo and the fact that some of them, resulting from national architectural competitions, acted as true manifests in the oeuvre of the participating architects. Amongst them, older, second generation modernists like Kunio Maekawa (Japan) or Ernesto Rogers (Italy) created important turning points in their careers. A remarkable amount of debutants—Vjenceslav Richter (Yugoslavia), Sverre Fehn (Norway), Reima Pietilä (Finland), Corrales and Molezun (Spain) or Sergio Bernardes (Brazil), etc.—incorporated their downright visions on contemporary modern building in the national representations. Through these diverging opinions on modern architecture, there seems to be one joint motivation: a general discontent or doubt with the then canonised modern architecture. The assembly of these scattered *anxious modernisms*³ on Expo 58 illustrates different strategies to cope with the loss of belief in the interwar ideals of modern architecture, offering a range of interdisciplinary influences in the attempts to reinstate the foundations of modern building or at least to enlarge its idiom.

The Finnish pavilion at Expo 58 resulted from a complex national context. On the one hand, the concept of the design relies heavily on clear, rigid module theories, on the other hand, it is guided by strong notions of subjectivity (an analysis of the experience of the environment) of morphology (interpreted as well as the study of form as the study of morphing) and of 'Finnishness' (tracing a national imagery paralleling the 'typical' landscape and the 'national' language). The pavilion is exemplary in the way these contrasting theories and approaches instigated a building that "unites every original element and all useful circumstances of the chaotic and excessive 'kindling' of the ideas and language of the architecture of this century."⁴

THE ZERO DEGREE POINT OF ARCHITECTURE

By the time Pietilä graduates as an architect in 1953, Finnish architecture was marked by what Malcolm Quantrill has called the 'Aalto Climate'.⁵ Aalto's work had become a framework of reference for architects in post-war Finland. Although modern Finnish architects benefited to a large extent from Aalto's successes and international recognition, his dominance created a climate that was sometimes experienced as intolerant of competition. The situation was summed up by Reyner Banham who, in "The one and the few",⁶ pointed out that it were Aalto's freedoms, but not his methods that were taken over by the younger generation. In combination with Aalto's highly personal approach to architecture, his dominance created a vacuum in his homeland from the fifties onwards.⁷ The situation was explicitly stated with Aalto's retreat from architectural theory in 1958. In reaction to an attack on his intuitive approach to architecture by the architect Aulis Blomstedt, Aalto wrote: "God made paper for drawing architecture on. Everything else — at least to me — is a misuse of paper."⁸ In sharp contrast to Aalto, Blomstedt promoted a theory-based, 'true' architecture. In his position as a professor at the University of Technology of Helsinki from 1958 to 1966, he strongly influenced the rationalist and constructivist praxis of the younger generation. Blomstedt's theoretical ambition to grasp back to the roots of modern architecture pitted him against Aalto, dividing Finnish architecture into two opposing schools for a long time: one of an Aalto-Romantic and one of a Blomstedt-Harmonic tendency.⁹

Apart from his teaching assignment, Blomstedt was the main force behind the PTAH (Progrès Technique Architecture Helsinki), the Finnish CIAM delegation that was mainly concerned with the theoretical aspects of architecture.¹⁰ In August 1954, the PTAH organised a six-day

summer course at Imatra. The course concentrated, in accordance with CIAM IX on the 'problems of living', as well as on 'theses of form'. The report on the findings of the course paralleled Blomstedt's theoretical quest and concentrated on the interactions between form-structure-function-material, stating that form and content are equal starting points in human and natural structures; beauty is considered a structural principle of nature: "Form and beauty appear as proportion, and perfect proportional beauty is often the result of a simple mathematical pattern. Thus beauty also expresses efficiency."¹¹

The proposed research into theses of form originated from an urge to rediscover the fundamental principles of architecture. These 'Zero Degree-seekers'¹² reacted against an estranged modern architecture and idealised 'pure' form, composition, objectivity, functionalism and 'honesty': "Clarity was the key and had to be represented by a typology of literal, objective form."¹³ The young Pietilä, fresh out of war and college, participated in the Imatra-course and resolved to test the theories of his colleagues in practice. In his studio, Pietilä experimented with small wooden block studies, out of which he later developed his *Stick Studies* (published in 1957 and 1958): composed around a stick, different compositions with blocks, parallelepipeds, were carried out of which two dimensions were kept constant while one varied according to a mathematical defined proportion. Some of these transformations are endless, others are terminable, but all are merely 'possible solutions'. The stick studies are the starting point of Pietilä's own investigation of form: form was — especially in his later studies like *Tortoise* (1957) and *Giant's Foot* (1959) — mobile but rectilinear, organised, dimensioned. The mostly empirical design process was based on the process of making: the changing, modularity and transformability, prevailed over the actual module itself.

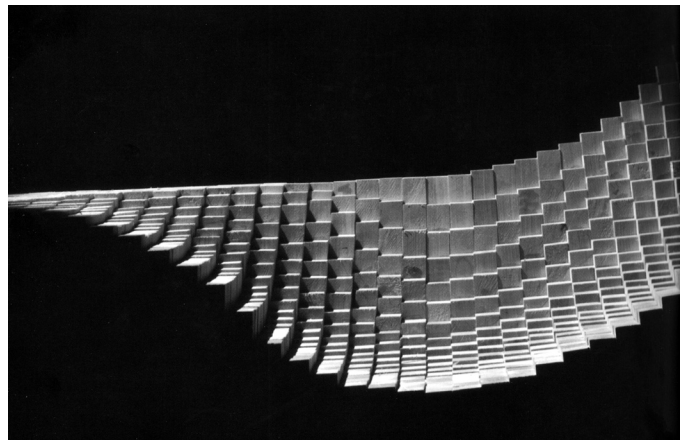


Fig. 1. R. Pietilä, *Tortoise* (1957), Museum of Finnish Architecture, Pietinen.

RATIONALISING THE DESIGN PROCESS

The stick experiments, instigated by Blomstedt, come forth from the above mentioned Zero Degree-attitude: to discover the roots of true architecture and compose its theory; architecture as a system was dismantled into its composing fragments, actions and relations. Blomstedt's architectural ideal followed the example of the 1920s *De Stijl*-movement. His fascination for 'true' proportion and composition lead him to the field of harmonic research into measurement and proportion systems of architecture. Eventually, the Blomstedt proportion theory relied heavily on the Pythagorean tradition: "If one wishes for something new, one has to seek that which is oldest" Blomstedt wrote.¹⁴ Because of its lack of dimensional precision — not being fit for use in practice and prefabrication — Blomstedt considered the Golden Section a forgery, thereby refuting Neumanns *Système MO* or even Le Corbusier's *Modulor*.¹⁵ The Blomstedt research was based on Pythagorean numerology, a study of musical harmony founded on the idea that world harmony could be expressed by the numbers 1, 2, 3 and 4. This harmonic proportion was an axiom in natural science and therefore an apt certain base for Blomstedt's module theory. In the early fifties, Blomstedt introduced the dimension of his *Module Man*: 180 cm.¹⁶ By 1961, the proportion studies resulted in the *Canon 60*, a system of measures and proportions based on the number 60 harmonic division.¹⁷ Blomstedt would use his Canon in all of his later work, offering a tool for standardization in practice: "I have tried to find an invariance, which would free architects to concentrate on essentials."¹⁸ Nevertheless, the graphic appeal of the visualisations of Blomstedt's studies, also clearly reveals a poetic sensibility beyond the pure scientific level.

The *Canon 60* was first published in the magazine *Le Carré Bleu*.¹⁹ The Finnish/French-language magazine was founded in 1958 and served as a forum for theoretical writings on architecture. In its early years it was closely linked to the PTAH and was strongly influenced by Blomstedt.²⁰ The manifesto of *Le Carré Bleu* clearly states its main goal: trying to give an answer to the necessity of a renewal of architectural thought. The introductory text by Keijo Petäjä questioned the simple causal relation expressed in the well-known adage of *form follows function* and focused on the creation of a state of balance between the manifold elements of the design process. In the same year, Blomstedt summarises his objections, accusing contemporary architecture of being empty and full of sentimentality. A new theory should arise with attention for the pure architectural form: "The loss of courage and honesty when facing the fundamental problem of form in architecture is at the basis of this nihilism"²¹ he

concludes, while studying invariables and reciprocal influences and quoting Mallarmé's *Toute maîtrise jette du froid* as a motto.

By the constant shading of ideas through many contacts, their shared interests in philosophy and math, a common search for a new language in words and forms, the ideas of the founder members of *Le Carré Bleu* became, in the early years between Imatra and the first issues of the magazine, interchangeable. This 'interchangeability' of thought, text and even design is an important feature in the evaluation of Pietilä's ideas in relation to those of the group. Although his enthusiasm for language and even linguistics might even be older than his interest in architecture, this interest will be at the origin of his 'swerve' from the ideals of *Le Carré Bleu*, ending up in his studies engaged in architectural morphology, zoomorphism and tradition as a layering of myths, archetypes and genetic coding. In the context of the Brussels Pavilion, Petäjä's study "La perception de l'Espace Réel"²² sheds a light on the originality (or the lack of it, according to one's point of view) of Pietilä's contemporary study. Petäjä's real space consists of four dimensions—the fourth, here also, is time. The research goes into the perception of space, the link between the physical-mathematical synthesis of space—what is—and the natural abilities of perception—what can be perceived. As will be pointed out later, these interests, although sometimes very practical, come close to the results of Pietilä's *Stick Studies*.

DISSECTING THE DESIGN PROCESS

Ever since Imatra, Pietilä continued his empirical but abstract studies and reflections on repetitive systems, modulations, movability and transformability of mass. In contrast to Blomstedt, Pietilä's goal was not the module system itself, but the opportunities it offers to artistic expression. In his text "Transformability",²³ when describing abstract 3-dimensional compositions of rectangular surfaces, it becomes clear that his ends reach further: not the mere material modulations are of interest, but also the way in which light and perspective deformations 'work' on the sculptures. Experiments like *Tortoise* remarkably illustrated how small blocks could modulate into curves (similar to how integrals in math decompose a curved surface), reversing form, altering solids and voids. The material sculpture seems to change, appears to be 'dynamic', when seen in a different light or from a different viewpoint. Conform to Petäjä's ideas; Pietilä's objects explore the difference in what is made and what is experienced according to the conditions of perception. They obtain a degree of mobility. Parallel to this series of experiments dating

from 1954 to 1959, Pietilä made but one building — his first ever: the Finnish Pavilion in Brussels, the only ‘sculpture’ with an interior, a structure that offered a double façade or environment, to be experienced from the outside and inside.

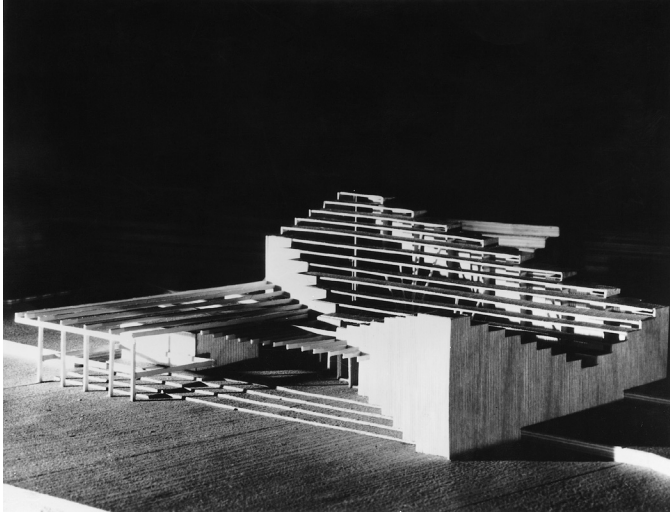


Fig. 2. R. Pietilä, Model of the Finnish Pavilion (1956), F.G.S.

During the preparatory period, Pietilä and Blomstedt participated in the 1956 CIAM X-congress, at Dubrovnik. Although their two presentations — a socio-economic study on the city and a project for an underground arctic city — where severely criticized, Roger Connah would mark the event as Pietilä’s personal Zero Degree. Gropius’ and Le Corbusier’s letters — “The Generation of 1956 will take command” — made clear to Pietilä that architecture had become a relay race: “the baton was being handed over.”²⁴ This position of belatedness, in the same sense as the ‘Aalto Climate’, would become a touchstone for Pietilä, a source for his constant attempts to break away from orthodoxy. His dislike for convention also turned against the numerical modulation and other Blomstedt theories: “the *Le Carré Bleu* group was searching for a ‘true architecture’, but I was just trying to find my own way.”²⁵ Taking his master’s insights as an example, Pietilä developed his own theories since, according to him, the international form language still seemed in need of a supplement, of a set of counter-ideas to the existing ones. In the first issue of *Le Carré Bleu* Pietilä published his “The Morphology of Expressive Space”,²⁶ where he later will refer to as his farewell to numerical aesthetics. In this seminal text, two equivalent methods of composition are confronted: an empirical design process, arising from experiences with material objects and a theoretical approach, based on abstraction and on organising systems. Pietilä proposes an interaction between both. In his analysis, he offers a corrective on the Blomstedt approach by stressing another problem: contemporary

architecture is deprived of a fit language and sign system. Modern sciences might offer a solution, though in Pietilä’s view architecture takes little or no advantage of their progress when it comes to theoretical interference. Notwithstanding this evolution, according to Pietilä the design process will retain its intuitive character.

The different strategies regarding the implementation of theoretical modular studies in writings and in building practice is revelatory for Pietilä’s break away from his *Le Carré Bleu* colleagues. In this respect, the theoretical approach of the group offers him but a framework to dig out his own study into the design of form: “Mondrian studies became buildings for Petäjä, Blomstedt and Revell. Pietilä’s Mondrianesque studies only seemed to remain studies. They were to become transformations of light and surface.”²⁷

THE BRUSSELS PAVILION: A SILENT REVOLT OF THE POETRY OF ARCHITECTURE?

At the time Pietilä presented his design for the Finnish Pavilion for Expo 58, entitled ‘Kierteissyinen’ or ‘Spiral Grain’, it was considered to be the incorporation of the Blomstedt modular theories. It is not surprising then, with Blomstedt and Viljo Revell as members of the jury, that the project won first prize in the national architectural competition. Whilst explicitly putting the rationalist proportion into practice, the project surpassed the threat of modular rigidity and obtained an Aalto-like, formal freedom, in sharp contrast to the other competition projects.²⁸

The pavilion consisted of two parts: a closed irregularly shaped, but modulated monovolume with a double sloped roof which, at its central lower part, was linked with a low, almost fully glazed rectangular volume. The latter was built up by the same module of the main exhibition hall, although it stood aside autonomously and was not given shape by the same transformation system as the monovolume. The entire structure was made of wood: yellow-red pine for the structure and the façade, as well as for the interior floor and ceiling and birch plywood for the inner panelling. The measurements of the monovolume’s basic elements were reminiscent of Blomstedt’s experiments: all had a width of 90, 180 or 270cm. Pietilä’s modulation design — in his own words a ‘piramide à gradins’ — consisted of 22 parallel parallelepipeds, being the basic modules of the rational design. One after another, the parallelepipeds were transformed in height and span. The exterior height, starting at 610cm increased or decreased with

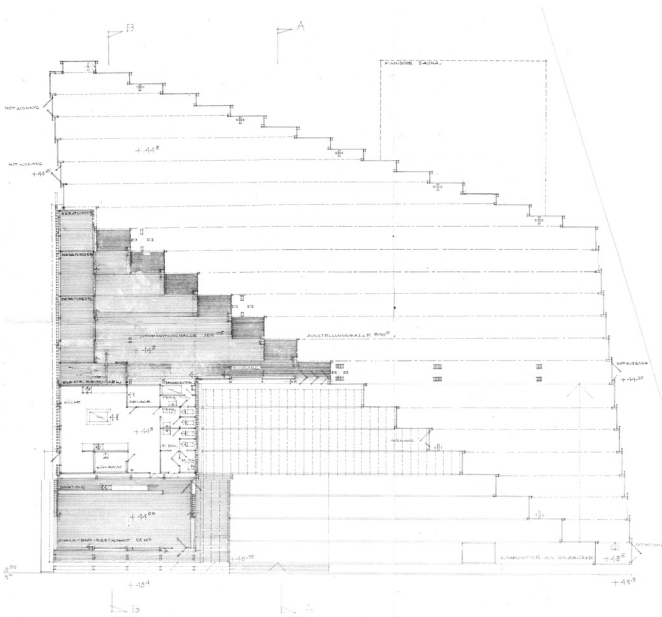


Fig. 3. R. Pietilä, Plan of the Finnish Pavilion (1957), F.G.S.

70 cm (which enabled clerestory windows) to 1170cm in the front and 1520 cm at the back of the monovolume.

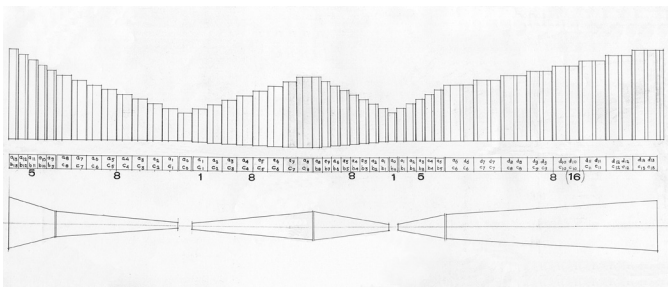


Fig. 4. R. Pietilä, Algebraic scheme of the Finnish Pavilion's façades (1958), Pietilä archive.

Pietilä offers three different possible readings of the design in his note "Pavillon de la Finlande. Trois interprétations."²⁹ Analysing the composition, he 'dematerialises' (Pietilä) the forms into 'mathematical' symbols: c , a , d and offers with them an algebraic, arithmetic and geometric interpretation, without preference, as they are mere "dialects of the same language, representing different ways of symbolising." The algebraic analysis offers a development of the façades, additions or diminutions of a (180cm), b (18cm), c (270cm) and d (90cm), illustrating the pavilion as a result of the grouping of elements and not of a division of one formal unit. Pietilä stresses the 'dynamic growth' of the elements: apart from the changes in height, the span of the parallelepipeds develops by $17 \cdot c$ in the southern front and by $5 \cdot b$ in the western façade, while evolving at the eastern side by $14 \cdot b$ and $16 \cdot c$ in the northern façade.³⁰ The module of the

development in the depth is constant (a), but halved at the back ($a=2d$).³¹ The intuitive arithmetic interpretation focuses on the relations between the quantities of changes per façade and the dynamic impressions of continuity, tension and rhythm it invokes because of the multiplicity of similar elements. The geometric interpretation treats the 22 parallelepipeds as 3-dimensional units with variable height and span, according the given measurements.

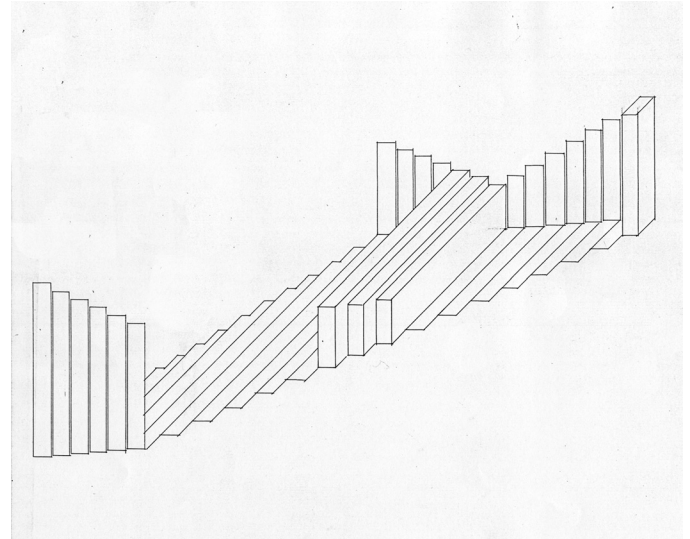


Fig. 5. R. Pietilä, Geometric scheme of the Finnish Pavilion's parallelepipeds (1958), Pietilä archive.

In all three analyses, the building is treated as a sculpture and the design process as an abstract mind game in which formal identities have the ability to grow, shrink and move within a fixed mathematical system: "The building is conceived as a great wooden sculpture, not so much as a structural combination of the constructive parts",³² Pietilä stated. He proposes even more diverging interpretations, revealing the intended complex layering of the design. When one considers the pavilion as a building, the mind game loses its rigidity, resulting in the very irony of the project. Whilst using the measurement system and prefabrication's repetitive image, the structural solution turned out a compromise. The construction was built up on site out of isolated panels attached to columns in contrast to the original intention of prefabricating the parallelepipeds out of slats and self-supporting H.B.-frames. Though the myth of prefabrication persisted in the contemporary press, Pietilä later admitted to Quant-rill, explaining that the imagery of the pavilion developed its 'own logic': "Of course the concept of 'own logic' has also been expressed in our aesthetics to reveal things with their innate individuality and independence. But I use the phrase in the ironic sense as well."³³

The use of only one material and basic form, arranged by an intelligible transformation, gave way to a fascinating play of light and shadow. The wooden façade and copper roof appeared as dynamic, undulating surfaces where, again, the 'movement' prevailed over the module of composition. Contemporary critics enthusiastically interpreted the building as a salutary correction amidst the structural exhibitionism at Expo 58. The pavilion even figured as central feature in Guilia Veronesi's comment on expo: "the pavilion of Pietilä accomplishes silently the revolt of the poetry of architecture against the technicality in which the lights of the architects of our time fade out."³⁴



Fig. 6. R. Pietilä, Finnish Pavilion, seen from the Avenue des Nations (1958), Va&S.

THE MORPHOLOGY OF FINNISHNESS

Introductory to his three interpretations, Pietilä explicitly states that his note doesn't describe the 'particularities' that motivate the design, like regional or cultural circumstances, techniques or personal ideas and preferences. Nevertheless, representing the Finnish nation at the World's Fair, the question of nationality, national style or 'Finnishness' was an important feature in the design. Pietilä referred to the Karelian Barn, a monumental vernacular log building typology, and the Finnish Forest when discussing the morphology of the project. In both the images, the use of wood is essential; moreover the material "strengthened the feeling of archaic mystery."³⁵ Pietilä also combines an accepted national imagery with his own studies in Finnish form, pointing to his own Finnishness as at once source and solution to his approach: "[I am] a spectator on the edge of European activity, watching what is going on. [...] Personally, I am interested rather in the basic smell of architecture. What I am trying to give is a little Finnish perfume."³⁶

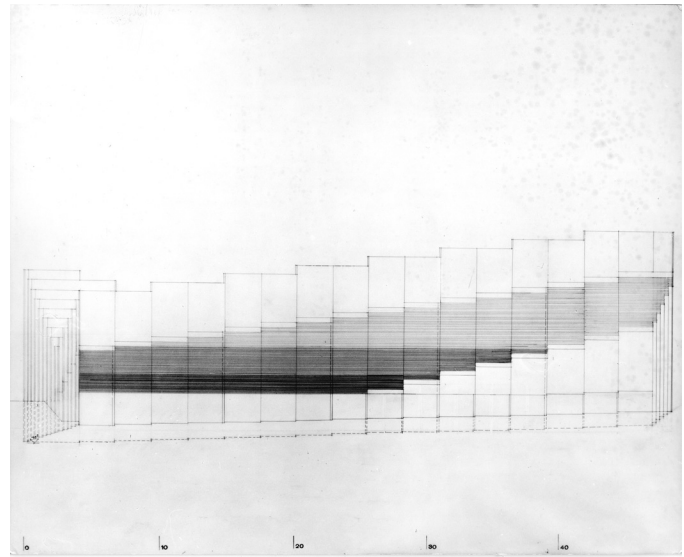


Fig. 7. R. Pietilä, Section through the Finnish Pavilion; indication of the ceiling (1957), F.G.S.

When the figurative vernacular of the Laplander's hut determines the outer skin of the pavilion, its interior, a 'lyrical space' (Veronesi), referred to the Finnish Forest through the interaction of light and perspective. Throughout several earlier (inter)national exhibitions, the forest theme was presented as part of a 'national' image of Finnishness, most notably in Aalto's pavilions for the Worlds' Fairs of 1937 (Paris) and 1939 (New York). Pietilä intended the light, shed by the north or south oriented clerestory windows, to be filtered through different layers of structure, composed of a sloping grill of wooden slats, imitating the foliage of a wood. These slats were hung under deep trusses that spanned half the pavilion from both tops to heavy X-shaped, expressively lit timber supports at the lowest point (interior height: 270cm). Pietilä's design sketches illustrate his empirical approach to the play of perspective and light in the pavilion. Early designs even witness his original endeavour to complete the forest atmosphere of the interior with fan shaped columns — reminding Aalto's Säynätsalo town hall (1952) — standing firmly on the ground, as if it really were trees in a forest. Although Pietilä had put forward a clear overall vision for the pavilion interior and the arrangement of the exposition (in collaboration with Timo Sarpaneva), the Finnish Fair Committee, for unclear reasons, awarded the commission for the exhibition to Tapio Wirkkala.³⁷ Wirkkala severely harmed Pietilä's investigation in forest imagery by blinding out natural light coming from the sole clerestory windows.

Brussels is the starting point of Pietilä's exploration of Finnish form and its symbolic meaning. While the investigations of his stick studies enabled him to fully



Fig. 8. R. Pietilä, Finnish Pavilion, interior during construction (1958), Pietilä archive, Pietilä.

cultivate the module aesthetics at Brussels, Pietilä used this experience as a means to express the more tacit typology of the barn and the forest, memories that "were forming a kind of lyrical background, an irrational aspiration to link up with something that could be felt genuine by the whole nation."³⁸ In conclusion, one cannot yet speak of a true rift from the *Le Carré Bleu* ideas in the Brussels design, but rather of a personal interpretation. In this respect, the programme of the commission—the promotion of the modern Finnish state—closely linked up with Pietilä's interest in new, personal forms. After the Expo 58 experience, the balancing between a rational, rectilinear approach and a pictorial, associative design method resulted in a double submission in the architectural competition for the Pavilion of the Nordic Nations in the Venice Biennale Gardens (1958).³⁹ The double design is revelatory for a schism which would lead up to his obvious and conclusive 'swerve' from modular logic in the Kaleva church design (1959).⁴⁰ The Brussels pavilion is, in more ways than one, a reconciliation of the Aalto approach and the Blomstedt theories. Whether consciously or not, the Brussels pavilion embodies a true balancing act between the intuitive and rational tendencies in Finnish modern architecture. In Pietilä's words: "It was an idea for making Finnish architecture natural and intellectual at the same time."⁴¹

NOTES:

¹ There are few exceptions, like: Marc Treib, *Space calculated in seconds. The Philips pavilion. Le Corbusier. Edgard Varèse* (New Jersey: Princeton University Press, 1996), Johanna Kint, *Expo 58 als belichaming van het humanistisch modernisme* (Rotterdam: 010 Publishers, 2001) and Rika Devos and Mil De Kooning, *De Coene op Expo 58* (Courtrai/Ghent: Stichting De Coene/GUAEP, 2003). Apart

from these studies, brief analyses of singular pavilions can be found in monographs on the architects of the pavilions.

- ² The Belgian C.I.A.M.-delegation wrote: "Expo 58 is a big fiasco from the architectural point of view" in "Activités C.I.A.M. belge," *Architecture* 22 (1957): 905. Also international renowned critics like J. M. Richards (*The Architectural Review*, August 1958), Sibyl Moholy-Nagy (*Progressive Architecture*, August 1958) or Ernesto Rogers (*Architects' Yearbook*, 1960) attacked the expo's flimsy architecture.
- ³ Sarah Williams Goldhagen and Réjean Legault, eds., *Anxious Modernisms* (Cambridge: MIT Press, 2000).
- ⁴ Guilia Veronesi, "Seconda Visita all'EXPO," *Zodiac* 3 (1958): 213.
- ⁵ Malcolm Quantrill, *Reima Pietilä. Architecture, context and modernism* (New York: Rizzoli, 1985).
- ⁶ Reyner Banham, "The one and the few. The rise of modern architecture in Finland," *The Architectural Review* 753 (1957): 243-248. Banham remarks the 'sudden' appearance of Aalto in Sigfried Giedion's third edition (1954) of *Space, Time Architecture*, confirming him as 'one of the four masters of modern architecture.'
- ⁷ Helin Pekka, "Reflections of the national and the international in modern Finnish architecture," *Abacus* (1979): 165. In contrast to Blomstedt, Aalto's architectural theory was rather fragmented.
- ⁸ Alvar Aalto, "in lieu of an article," *Arkkitehti* 1-2 (1958), in Göran Schildt, *Alvar Aalto in his own words* (New York: Rizzoli, 1997).
- ⁹ Roger Connah, *Writing architecture, Fantomas, Fragments, Fictions, An Architectural Journey through the 20th Century* (Helsinki: Building Book, 1989).
- ¹⁰ The PTAH was founded in 1953 by Pentti Ahola, Aulis Blomstedt, Aarne Ervi and Ilmari Tapiovaara. Blomstedt and Keijo Petäjä participated at the CIAM IX-congress at Aix-en-Provence. Other PTAH-members were Eero Erikäinen, Reima Pietilä, Heikki Siren, Esko Suhonen, Kyösti Ålander and the philosopher Simo Sivenius.
- ¹¹ Marja-Riita Norri, "Heroes and matter — notes on the 1950s" in Marja-Riita Nikula, ed., *Heroism and the everyday. Building Finland in the Fifties* (Helsinki: Museum of Finnish Architecture, 1994).
- ¹² The formula *Zero Degree* is used by Roger Connah (*Writing Architecture*) in a parallel to Roland Barthes, *Le degré zéro de l'écriture* (Paris: Editions du Seuil, 1953).
- ¹³ Roger Connah (*Writing Architecture* speaks of an 'extraordinary relocation of culture' when exploring the theories instigated at Imatra.
- ¹⁴ Juhani Pallasmaa, "Man, Measure and Proportion: Aulis Blomstedt and the Tradition of Pythagorean Harmonics," *Acanthus* (1992): 7. Also see Helena Sarjakoski, *Rationalismi ja Runollisuus. Aulis Blomstedt ja suhteiden Taide* (Helsinki: Rakennustieto Oy, 2003). With English summary: *Rationalism and the Poetic — Aulis Blomstedt and the Art of Proportion*.
- ¹⁵ One could speak of a revival in the interest in harmonical proportion systems between 1950 and 1965, see: Rudolph Wittkower, "Systems of Proportion," *Architects' Year Book* 5 (1955): 9-18. Hermann Graf, *Bibliographie zum Probleme der Proportionen* (Speyer: Phälzische Landesbibliothek, 1958) refers to over 900 items on this matter. It is well known that Wittkower's *Architectural Principles in the Age of Humanism* (London: Walburg Institute, 1949) has profoundly influenced architectural circles in the fifties, cfr. Derek Linstrum, "The uses of architectural history today" in Ben Farmer and Hentie Louw, eds., *Companion to Contemporary Architectural Thought* (London: Routledge, 1993).
- ¹⁶ Aulis Blomstedt, "Module Variations on a 180 cm measure," *Arkkitehti* 4 (1958): 72.
- ¹⁷ The numbers of the Canon 60 come forth from the Pythagorean magic triangle — sides 3:4:5 — and the crossed geometrical proportioned series $x^0 \ x^1 \ x^2 \ x^3$. The Canon 60 is presented as a 'tetractus' figure, of which 60 (=3¹*4¹*5¹) is the central number. The corners of the 'tetractus' are 27 (3³), 64 (4³) and 125 (5³). Other numbers are: 36 (3²*4¹), 48 (3¹*4²); 45 (3²*5¹), 75 (3¹*5²); 80 (4²*5¹), 80 (4¹*5²). The

small inner triangles of the 'tetractus' positioned on their apex correspond to arithmetic proportions (ex. $45=(27+36)/2$), those positioned on their base to harmonic proportions (ex. $45=2*36*60/(36+60)$).

- ¹⁸ Juhani Pallasmaa, op. cit. In the international scene the appreciation for module design would not last. Rudolph Wittkower "The Changing Concept of Proportion," *Daedalus* (winter 1960): 198-215, mentions a vote at the RIBA-council in 1957, on the issue: "that systems of proportions make good design easier and bad design more difficult". The statement was dismissed with 48 votes pro and 60 contra.
- ¹⁹ Aulis Blomstedt, "Canon 60," *Le Carré Bleu* 4 (1961).
- ²⁰ The founding members of *Le Carré Bleu* are to a large extent the same people who participated in the PTAH: Blomstedt, Eero Erikäinen, Keijo Petäjä, Reima Pietilä, André Schimmerling and Kyösti Ålander.
- ²¹ Aulis Blomstedt, "La deshumanización de la arquitectura," *Le Carré Bleu* 2 (1958): 2.
- ²² Keijo Petäjä, "La Perception de l'Espace Réel," *Le Carré Bleu* 1&2 (1959): 1-3. His study "L'Espace Réel" (The Real Space) goes back to Imatra.
- ²³ Reima Pietilä, "Transformoitavuus," *Arkkitehti* 6-7 (1956), as published in Markku Komonen e.a., *Pietilä. Intermediate zones in modern architecture* (Helsinki and Jyväskylä: Museum of Finnish Architecture and Alvar Aalto Museum, 1985).
- ²⁴ Roger Connah, *Writing Architecture*.
- ²⁵ Malcolm Quantrill, *Reima Pietilä. Architecture, context and modernism* (New York: Rizzoli, 1985).
- ²⁶ Reima Pietilä, "Thème: La Morphologie de l'Expression Plastique," *Le Carré Bleu* 1 (1958): 2-8. Pietilä will continue to write for *Le Carré Bleu* in 1959. In 1958 he also symbolically broke with Blomstedt, turning down his offer to become his assistant at the Technical University of Helsinki.
- ²⁷ Roger Connah, *Writing Architecture*.
- ²⁸ "Competition for Finland's pavilion at the World's Exhibition 1958 in Brussels," *Arkkitehti-Arkitekten* 8 (1956): 124-130. Also see: Peter Mc. Keith and Kerstin Smeds, *The Finland Pavilions. Finland at the Universal Expositions 1900-1992* (Helsinki: Kustannus Oy City, 1992).
- ²⁹ Reima Pietilä, *Pavillon de la Finlande, Trois Interprétations*, unpublished note (Pietilä-archive, 111-3, K4). Drawings hereof were published in "Pavillon de Finlande à Exposition de Bruxelles," *L'Architecture d'Aujourd'hui* 81, (1958/1959): XVIII.
- ³⁰ Corrections should be made to this analyses, by adding $1*b$ to the eastern façade and $1*d$ to the northern, due to the solutions of the corners according to plan. This way, the analyses leads to the correct equation: $17*c + 5*b = 16*c + d + (14+1)*b$.
- ³¹ Here also, the equation should be corrected, resulting in: $17*a + 5*a + 1*d = (16-1)*d + 14*a$.
- ³² Reima Pietilä, *Notes to the project designs of the Finnish Pavilion at the Brussels World's Fair*, unpublished note (Pietilä archive, 111-3, K4).
- ³³ Malcolm Quantrill, *Reima Pietilä*.
- ³⁴ Guilia Veronesi, "Seconda Visita all'EXPO".
- ³⁵ Reima Pietilä, "Finnish pavilion, Brussels," *Casabella* 221 (1959): 18.
- ³⁶ Malcolm Quantrill, *Reima Pietilä*.
- ³⁷ Wirkkala's exhibition outlay would end up in a compromise of Pietilä's forest imagery and his own success formula from the Milan Triennials of 1951 and '54, which promoted Finland as the 'design country' par excellence. Wirkkala evoked a forest atmosphere by hanging linen cloth and wooden panels from the ceiling and by spraying pine oil.
- ³⁸ Reima Pietilä, "The Finnish Pavilion at the Brussels World's Fair," *Arkkitehti* 9 (1958): 156.
- ³⁹ The competition was won by the Norwegian Sverre Fehn, the architect of the Norwegian pavilion at Expo 58, which neighbored the Finnish. Fehn's Brussels pavilion was inspirational for his Venice pavilion.
- ⁴⁰ Kaleva church (designed 1959, constructed 1966), with its fish-like floor plan (a liturgical ictus) is Pietilä's experiment in convex-concave morphology. Although one could speak of a basic composing element here (the curved wall), the design no longer is marked by an interest in module logics.
- ⁴¹ Malcolm Quantrill, *Reima Pietilä*.