

Alvar Aalto and the problem of architectural research

Eva Eylers

Dipl.-Ing., M.A., Ph.D.
Technische Universität Berlin
Fakultät VI
Straße des 17. Juni 152
D - 10623 Berlin
e.eylers@ucl.ac.uk
+49-1705660255

Alvar Aalto and the problem of architectural research

Dr. Eva Eylers

Abstract

"During the past decades architecture has often been compared with science, and there have been efforts to make its methods more scientific, even efforts to make it a pure science."¹

Despite this quote by Alvar Aalto being almost 80 years old, the "problem of architectural research" has not yet been fully resolved: What exactly constitutes substantial research in architecture and will an increasingly scientific (evidence-based) approach really improve the quality of (public) space?

Although there is a demand to establish a clear position² and in recent years there were important attempts to "demystify" the topic³, architectural research still operates in a distinct grey-zone.

To help us recognize the traps and possible shortfalls within the field of architectural research as well as its great potential for the architectural profession, this paper proposes to discuss Alvar Aalto's research strategies for the tuberculosis sanatorium in Paimio which, inaugurated in 1933, became one of the icons of modernism.

Strict medical demands posed on the environment for the lung patient had been, since the emergence of the sanatorium in the 1860s, a driver for technical and infrastructural innovation (from air-filters to elevators and efficient heating systems), but also for architectural experimentation. While Paimio became initially famous for its daring seven storey concrete structure, this paper will concentrate on the methods leading to the innovative detailing for the two bed patient room, which demonstrates that the sanatorium's potential as a testing ground for the development of architectural standards had been fully embraced.



Patient room ("Varsinais-Suomen Tuberkuloosiparantola", p. 72, Canadian Centre for Architecture, Montréal)

According to Aalto "experimental rooms" were used to determine the patient room layout and a closer look at the peculiar transition (cavetto) between floor and window will allow us to speculate on the collaboration / interaction between doctors, patients and architects in the design process.

¹ Aalto: "The humanizing of Architecture", *The Technology Review*, Nov. 1940, in: Schildt, p.102

² In a science driven society which increasingly demands reliable facts to work and calculate with it seems that architects, as Richard Saxon states, "can no longer rely on their aesthetic and communications skills to convince clients and other stakeholders of their ideas." Instead, like other professionals, "they need evidence of what works and what delivers relevant value."

³ Compare for example: *Architectural Research Methods* (Linda Groat, David Wang, 2013), *Design Research in Architecture* (Murray Fraser (Ed.), 2013), *Demystifying Architectural Research: Adding value to your practice* (Anne Dye, Flora Samuels (Eds.), 2015) and *Research Methods for Architecture* (Ray Lucas, 2016)

The patient room, together with Aalto's reflections on science presented in early articles may help us rethink the relationship between architecture and research and support the development of a research framework which takes advantage of / acknowledge the intuitive and creative element in the architectural design process.

The question should therefore not be how to bend and squeeze our projects into an existing framework valid for other professional contexts in order to gain access to new funding streams and to regain (supposedly) lost authority and trust from our clients. Rather we have to ask how to „produce research that is distinctively architectural in nature“⁴, since“architecture is not a science. It is still the great synthetic process of combining thousands of definite human functions, and remains *architecture*.”⁵

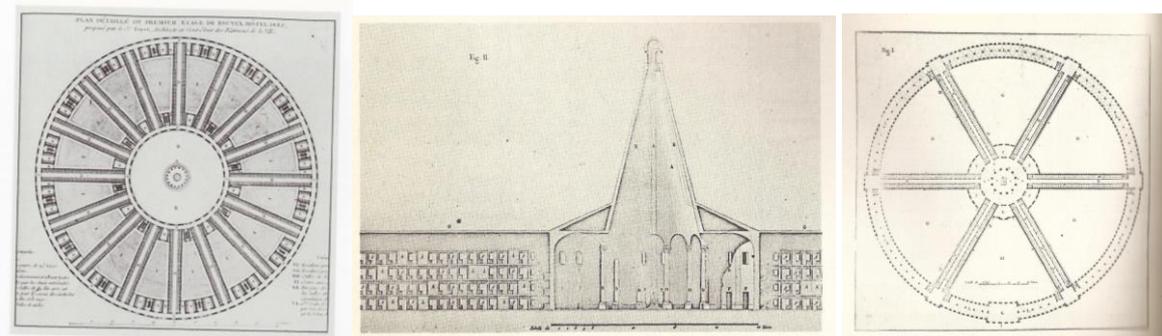
Introduction

Evidence-based design: early examples

Although evidence-based design⁶, which has become particularly popular in healthcare to improve the well-being and recovery of patients, might seem a relatively new field of study, we can trace the approach to relate statistical data to the quality of (hospital) spaces back to the late 18th century.

After a devastating fire at the infamous “Hôtel-Dieu” in Paris, health commissioners of the Académie des Sciences produced a report which related the hospital's high mortality rates to overcrowding and the overall “insalubrious space”. After comparing, for example, the amount of air that was available to each patient with the mortality rates the commissioners demanded a reform of the hospital plan: the single patient should be granted more space while the overall space should be used more efficiently. The commission pleaded for an overall improved ventilation of the wards and also made concrete design suggestions, demanding “no more than 36 beds in a ward, all single beds, iron bedsteads and iron window frames.”⁷

Although none of them were realized, in the following decade a number of plans came to be developed with the aim to answer the report's demands for a new, better ventilated and altogether more efficient type of hospital.



Caption: Left: Bernard Poyet, 1785 design for the Hôtel-Dieu with sixteen radii / wards, 5000 beds
Right: Dr. Antoine Petit, hospital at Belleville, 1774 plan and section with funnel-shaped tower acting as ventilator (six radii / wards: 2000 beds) (source: Mémoires de l'Académie des Sciences)

About 75 years later, we see a further groundbreaking step in the rationalization of hospital design. Florence Nightingale's first hand experience of the sanitary conditions in military hospitals, especially

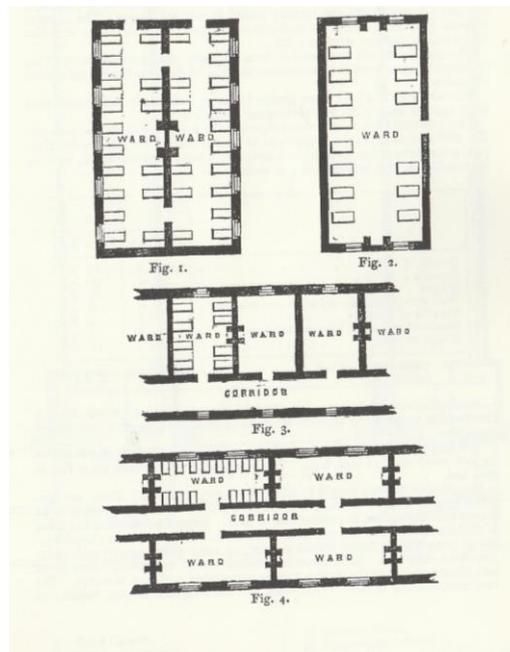
⁴ Ray Lucas: *Research Methods for Architecture*, p.8

⁵ Aalto: “The humanizing of Architecture”, *The Technology Review*, Nov. 1940, in: Schildt, p.103)

⁶ Evidence based-design can be loosely defined as „the process of basing decisions about the built environment on credible research to achieve the best possible outcomes.“ (compare Anderson: “Humanizing the hospital”, CMAJ, August 2010, p. 535)

⁷ Nikolaus Pevsner: *A History of Building Types*, (1970) p.151, 152.

during the Crimean War (1853-56), had made her a passionate advocate of a fundamental hospital reform for which she formulated an indisputable argument:



Caption: "Common errors in hospital ward construction" (Florence Nightingale, *Notes on Hospitals*, p. 103)

Nightingale's *Notes on Hospitals* (1859) demonstrates how empirical data and systematic spatial analysis informed her design proposals for the improvement of military and later general hospitals. Although the germ theory of disease had not been fully accepted then, Nightingale's deductions from her spatial analysis and the comparison of the statistical data deriving from a variety of hospital wards drew her into the right direction and would lead to significant improvements in sanitation⁸, culminating in the project for St. Thomas's in London, one of the most progressive / modern hospitals of its time.

Another 70 years later we witness the planning process of what Sigfried Giedion saw as "inseparably linked to the rise of contemporary architecture"⁹ and Peter Blundell Jones "the epitome of Modernist hospital design"¹⁰: Alvar Aalto's tuberculosis sanatorium in Paimio.

Within a state health programme that progressed spectacularly during the 1920s and 1930s, an extensive network of sanatoria for tuberculosis as well as mental health institutions was created for Finland.¹¹ Among them was Paimio, which came to be praised as the logical architectural outcome of the demands of medical sciences, as rational, functional for its purpose and based on international if not universal grounds. More recently Paimio has been even established as an example for the current field of evidence-based hospital design, given the "comprehensive design strategies", where the individual's privacy and comfort were of central importance". In "Humanizing the Hospital", Diana Anderson even states that prior "to the development of evidence-based design, Aalto created a

⁸ Although the first plan for a hospital with detached pavilions had been used at Stonehouse Naval Hospital in 1764, Nightingale strongly argued for and thus further cemented the success of the pavilion type hospital in the 1860s and was famously involved in the realization of St. Thomas's hospital in London.

⁹ Giedion: *Space, Time, Architecture* (1941), p.629

¹⁰ Blundell Jones, Peter: "The hospital as building type" in: *The Architectural Review*, London, March 2002, p.42.

¹¹ The Finnish State founded a tuberculosis commission in 1922 and organised the health work dividing up the countryside in TB welfare districts and creating TB welfare offices in the cities. See Margaretha Ehrström, Sirkkaliisa Jetsonen, Tommi Lindh, *Nomination of Paimio Hospital for Inclusion in the World Heritage List* (Helsinki: National Board of Antiquities, 2005).

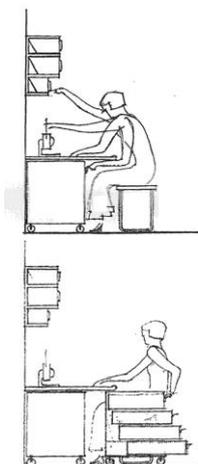
healing environment addressing each patient's psychological and social needs", thus leading to the empowerment of the patient.¹²

But which role did the scientific approach play for Aalto? Was Paimio's design approach indeed so fundamentally different compared to earlier sanatoria? And if so in which way may we benefit from it today?

The Aaltos' unit for the minimum apartment exhibition (Helsinki 1930)

Aalto's understanding of the relationship between research and design during his functionalist period sits within a more holistic understanding of the emergence of a new rational era, a new modern world, where "the individual exists in a porous relationship with his surroundings".¹³ The changed society demanded a new architectural form and the new form would to a degree also constitute a mould for the modern society.

The Aaltos' unit for the Minimum Apartment Exhibition in 1930 in Helsinki illustrates their understanding of a "scientifically based housing research" ("research based on similarities between human beings") which would then determine a standard for the "modern subject".¹⁴



63. Housewife working, seated in front of sliding units in the minimum apartment kitchen.

Caption: Aino Aalto's study of the body's movement, resulting in the famous kitchen diagram, was to determine the furniture layout of the apartment unit where "the body responded to the environment and vice versa".¹⁵

(Image source: Pelkonen, p.105)

The optimal environment for the scientific experimentation, which was needed to obtain what Aalto called the "flexible standard", was not the architectural office, however, but would prove to be Paimio sanatorium. From there the optimized objects, furniture or spatial compositions could travel and enter the realm of the commercial or the domestic space.

¹² Compare: Diana Anderson: "Humanizing the hospital: Design lessons from a Finnish sanatorium", CMAJ, August 2010. Anderson explains further that "the details incorporated into the building design by Aalto illustrate many of the evidence-based design strategies published in recent years". (ibid., p.536)

¹³ Pelkonen, Eeva-Liisa: *Alvar Aalto Architecture, Modernity and Geopolitics*, Yale University Press, New Haven and London, 2009, p.58

¹⁴ In a *Domus* article from 1930 the architect explains the intentions behind the unit's development. Compare: Aalto in: *Domus*, No. 8-10, 1930; in: Schildt: p.77 – 78

¹⁵ Pelkonen: p.104

The sanatorium: a catalyst for scientific research

During the industrialization tuberculosis had spread rapidly in wide parts of Europe. Especially large cities were affected due to the bad working and living conditions. The long-term treatment in a sanatorium was often believed to be the only hope against this deadly disease, because no pharmaceutical cure would be available against the bacterial infection until the 1950s. To find the best way to treat TB, the sanatorium had been therefore traditionally a space for medical experimentation, where active research was confronted with established medical knowledge.

Although, like many buildings required by the course of industrialisation, the sanatorium had been without precedent and thus without a typological model, the infectious nature of TB placed specific demands on the planning of the institution.

The internal organisation had to be based on the principles of hygiene, strictly bound to medical and organisational necessities, and efficiency to avoid cross-infections between patients and staff. Cross ventilation, dust-free and well-lit spaces, as well as the provision of open-air rest facilities were furthermore general demands which had to be answered by the design.¹⁶



Caption: Geraniums in the double glazed windows and ceiling lamp for the dust-free environment (Paimio)

The institutional task was, however, more holistic: to provide an environment, which would activate the patients' overall health (self-healing, self-regulating forces) and thus their resistance against the disease. To foster for the physical as for the psychological wellbeing had thus been the sanatorium's *raison d'être*. And this demand could then, as it does today, inspire different architectural responses.

¹⁶ The patients' exposure to sun and fresh air was originally anchored in the natural therapy. (...) The aim to "live in well-aired and well-lit rooms, so that the germs, taken up in air, can be rapidly carried away by the flow of air or killed by light." (Koch: "The current state of the struggle against tuberculosis", Nobel Prize lecture from 1905, Amsterdam, 1967)

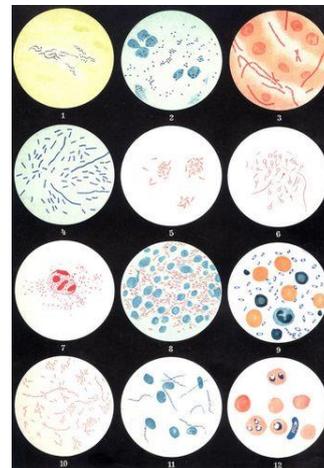
Due to the inspiring brief, the remote location¹⁷, and often generous funds, architects were faced with the rare opportunity not only to experiment with new materials and technologies¹⁸ but also to develop and express their visions for a communal life.

Ten years after his experience with Paimio, Aalto reflected upon the conducted experimental research in the *Technology Review* (1940): Although architectural research could not, according to the architect, be compared to medical research, some of its methods could be used in order to render “dysfunctional” situations more visible:

“Scientists very often use exaggerated forms in analyses in order to obtain clearer, more visible results – bacteria are stained, and so on. The same methods can be adopted in architecture, also. I have had personal experience with hospital buildings where I was able to discover that especial physical and psychological reactions by patients provided good pointers for ordinary housing. If we proceed from technical functionalism, we shall discover that a great many things in our present architecture are dysfunctional...”¹⁹



Paimio patient wing



Bacteria: Nr.8 Tuberculosis
(image source: Brockhaus, 1911)

Caption: To stay with Aalto’s metaphor we could see the sanatorium here as the environment for the “stained bacterium”, a well tempered Petri dish – a space which is particularly well suited to make things visible and obvious and thus allow the architect to develop generalizable deductions.

The sanatorium was seen at the same time as the most suitable environment for research and object of research, since it holds the best suited “research subjects”: the sensitive patients. The acquired knowledge could then be used for sanatoria but also for other building types, such as “ordinary housing”.

The experimental room as a laboratory: results will be transferred to new contexts

It has been frequently stressed that Paimio was an opportunity for Aalto to become involved in material and structural research and innovation. The concrete skeleton which was described as “an

¹⁷ In *Arkkittehti* 6/1933 Aalto describes the architectural freedom he was given through the Paimio site, which „is about 3 kms from the station and fairly isolated. Consequently, there were few constraints on the design of the entire building complex...”. (PCMP 2016, p.44)

¹⁸ Strict medical demands posed on the hygienic environment for the lung patient had been, since the emergence of the sanatorium in the 1860s, a driver for technical and infrastructural innovation (from air-filters to elevators and efficient heating systems), but also for architectural experimentation. To avoid coal fumes for the patients, the cogeneration of heat and power was for example first explored on a large scale for the Beelitz Heilstätten, an important sanatorium complex close to Berlin, founded in 1898.

¹⁹ Aalto: “The Humanizing of Architecture”, *The Technological Review*, Nov 1940, reproduced in Schildt 1997, p.102

enormous wonder of engineering and workmen's skills"²⁰ certainly pushed structural boundaries and the fruitful collaboration with the engineer Hartela resulted in Paimio's daring construction and - despite its size - the slender and elegant appearance.

Yet, what was truly innovative methodologically and justifies his model role for contemporary hospital planners is the use of an "experimental room" to determine the layout of Paimio's 150 two-bed patient rooms. This method where designers, patients and physicians would come together to test and evaluate different solutions deserves attention.

In "The Humanizing of Architecture" from 1940, Aalto refers explicitly to the Paimio experiments:

"To examine how human beings react to forms and construction, it is useful to use for experimentation especially sensitive persons, such as patients in a sanatorium. Experiments of this kind were performed in connection with the Paimio Tuberculosis Sanatorium building in Finland (...) Study of the relation between the individual and his quarters involved the use of experimental rooms and covered the question of room form, colours, natural and artificial light, heating system, and so on. This first experiment dealt with a person in the weakest possible condition, a bed patient. One of the special results discovered was the necessity for changing the colours in the room. In many other ways, the experiment showed, the room must be different from the ordinary room. This difference can be explained thus: The ordinary room is a room for a vertical person: a patient's room is a room for a horizontal human being, and colours, lighting, heating, and so on must be designed with this in mind."²¹

In order to provide a calming, non-disruptive environment²² for the "horizontal human being" Aalto further explained, that "the ceiling should be darker, with an especially selected colour suitable to be the only view of the reclining patient for weeks and weeks."²³

Since the creation of peace was regarded as the pre-requisite for the healing success, Aalto further studied lighting, ventilation, (famously) paid attention to the splashing noise of the wash basins, and also tried to even out the internal acoustics through the installation of one "soft", sound-absorbing wall.

Unfortunately, the architect remained vague about the actual setup of the experiments. Although it is clear that physicians were also involved in the experiments conducted in order to determine the final layout of the patients' room it has not been recorded how many patients took part in the experiments ("sample size") and whether "real TB patients" were engaged.²⁴ It is not unlikely that Aalto himself contributed most of the information regarding the preferences of the "horizontal patient". The architect had been allegedly ill and bedridden just before entering the Paimio competition and the experience of this time probably imprinted on the patient room design.

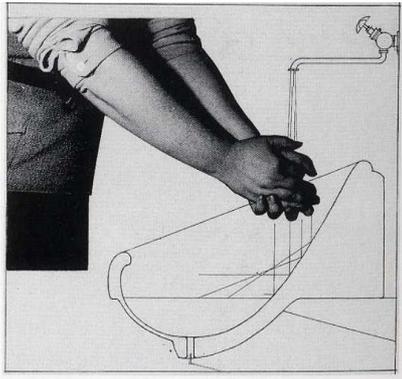
²⁰ Turunmaa 17.6.1933, in: Heikkonen, (Hg.): *Paimio Sanatorium Conservation Management Plan*, p.61)

²¹ Aalto, "The Humanizing of Architecture", in *The Technological Review*, Nov 1940, reproduced in Schildt 1997, 102 - 107

²² The task of the sanatorium was, according to Aalto's understanding, to provide a peaceful environment, appropriate for cure. "The main purpose of the building is to function as a medical instrument [...] One of the basic prerequisites for healing is to provide complete peace." Alvar Aalto, in: Reed: *Between Humanism and Materialism*, p.29. Accordingly in Paimio not only paces with similar requirements with regards to views or light were placed together but furthermore distributed according to a logic of noise.

²³ Aalto, in: *The Technology Review*, Nov. 1940; in: Schildt: p.103. The ceiling was accordingly painted in dark and calm colours (grey-green), not to exert the eyes, while the walls were kept in lighter shades possibly to give a more generous perception of the room.

²⁴ Unfortunately I did not find specific records of the experiments. We therefore lack information about who exactly and how many people were involved (sample size and if for example actual TB patients), and how exactly they were conducted. My deductions are based on Aalto's texts and the information provided by Hilla Pandy, an official guide of the Paimio hospital during a tour in August 2009, as well as by information given by Professor Kari Liippo.



Paimio wash basin
(image source: Reed, *Alvar Aalto*, n.69)



Patients' room lamp

Caption: "To avoid noise [...] wash basins (each patient in the two patient rooms had his own) were especially designed so that the flow of water from the faucet hit the porcelain basin always at a very small angle and worked noiselessly."²⁵

"The artificial light can not come from an ordinary ceiling fixture, but [to avoid glare] the principal centre of light should be beyond the angle of vision of the patient."²⁶

"Turf wars" (problem with responsibilities) in the experimental room: the cavetto

An indicator of how seriously Aalto integrated the medical expertise early on in his design and a testimony to the possibly not always smooth collaboration with the medical experts, is a detail, which has not been chosen to feature in the various early magazine publications: the transition between floor and window in the patient rooms.

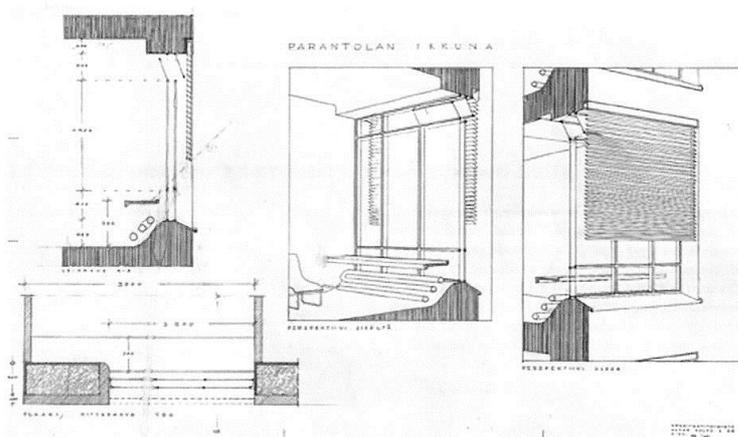


Fig. 35. A drawing showing the design principles of the patients' room window.

Paimio window sections and plan
(image source: Ehrström, Fig. 35, p.35)



Floor detail

Given the opposition of doctors involved in the implementation phase on the basis that the patient's feeling for security would be jeopardised with a full wall glazing, Aalto decided not to have the window meet the floor-level directly. Instead a convex curve is extending the floor upwards by about 25 cm to meet the window.

²⁵ Aalto in *The Technology Review*, Nov. 1940; in: Schildt: p.103

²⁶ *ibid*, p.103

Given that, as the occupier of the room (mainly lying in bed) one had to bend down to see this lower part of the room, how this minimal adjustment would provide for an increased feeling of safety for the patients remains questionable. Yet, this compromise seems to have satisfied the critical voices.

The collaboration with the medical profession: dialogue, compromise or compromising the design?

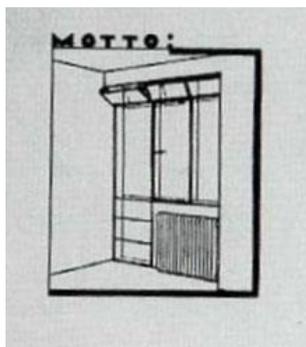
In sanatorium construction medical expertise had always played a central role. If the "places of healing" were not commissioned by physicians and thus designed according to their wishes in the first place. Although the collaboration between doctors and architects had thus been traditionally embedded in the development of the sanatorium²⁷, Paimio is considered, still today, as exemplary in these regards.

"Today it is becoming common for architects to hold focus groups or employ registered health professionals to obtain feedback on the design of health care buildings, but in the 1930s, this was not the case. Aalto was ahead of his time in consulting with physicians as he planned the sanatorium."²⁸

The discussed example of the outcome of the collaboration between doctors and the architect also allows for the question to be raised on how seriously Aalto took the results of the experiments and the medical expertise in case they did not meet his previous expectation and in case they threatened the formal appearance the architect had in mind.

Statements from medical experts had been considered by Aalto and his collaborators already during the competition stage for Paimio. During the implementation stage, however, the medical expertise would play an increasingly important role.

Altogether four specialists were chosen by the Paimio Building Committee to evaluate the functionality of Aalto's competition entry and subsequently to accompany the implementation stage²⁹: The physicians Markus Sukkinen (an original member of the building committee) as well as Severi Savonen, Niilo Mäkinen and Dr. Vöinö Horelli did not only suggest changes for psychological reasons (predictions about patient behaviour, as in the case of the patient room glazing -) or logistical reasons (based on their detailed knowledge of the daily patient routine), but also for economic reasons.



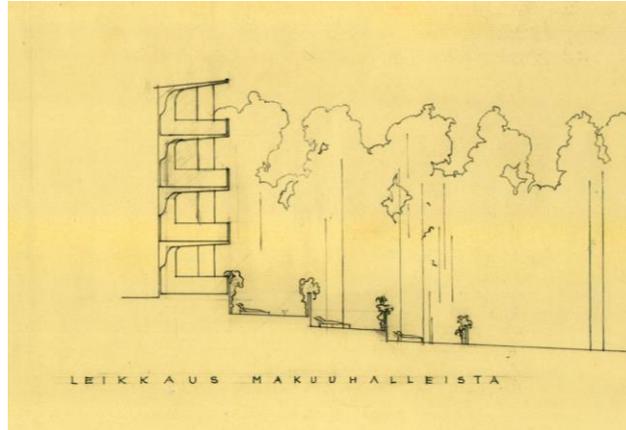
Caption: The Paimio competition stage motto, the L-shaped window
(image source: Reed, Alvar Aalto, n.56, amended by author)

²⁷ Examples are: Dr. Brehmer's sanatorium in Görbersdorf, Dr. Dettweiler's sanatorium Falkenstein or Dr. Turban's sanatorium in Davos.

²⁸ Anderson, p.537

²⁹ The Paimio building committee had been installed "to secure enough credibility for the requirements of medical opinion", and to prepare and accompany the sanatorium project. Ehrström, a.o.: p.24, 25

Most prominently, Aalto's competition motto, the L-shaped patient room windows fell victim to the "medical expertise" and was exchanged for (more conventional) square shaped ones.³⁰ Considered too expensive by the experts were furthermore the original patient bed decks for the fresh air therapy on the south side of the patient wing.



Caption: Paimio Sanatorium competition stage section detail 1929: outdoor pavilions / terraces flanking the south side of the patient wing (Makuuhalleista = outdoor halls / pavilions for the daybed cure / helio therapy)
Courtesy of Alvar Aalto Museum, Drawing Collection

What was ultimately retained from the competition stage was only the outline, which was translated into a cross-country ski-track like walkway zigzagging through the grounds. This compromise between designers and physicians resulted in a solution which may have still fitted the overall graphical design, but which has certainly weakened the original spatial composition.

Given that the experts therefore "interfered significantly (...) and many of the proposed alterations were realized despite leading to major changes in the design",³¹ I doubt that Aalto was particularly keen on the (forced) collaboration with medical experts on the project.

Scientific justification of the design: from prototypes to serial production

The possibly confrontational dialogue with the medical profession, however, had clear advantages for the later recognition of Paimio and its design objects. Given the design's foundation on medical expertise it was not only possible to create an indisputable argument for the Paimio project (prototype for the medical institution) but also to create a strong argument for the serial production of Paimio furniture. Many pieces were therefore developed as a standard with the possibility of subsequent mass production in mind.

The Paimio chair

Many of the furniture and standard parts which were developed specifically for the sanatorium became quickly commercially produced. Many of the lamps and light fixtures were developed specifically for Paimio, since the demand for a cleanable surface which would not gather dust was not

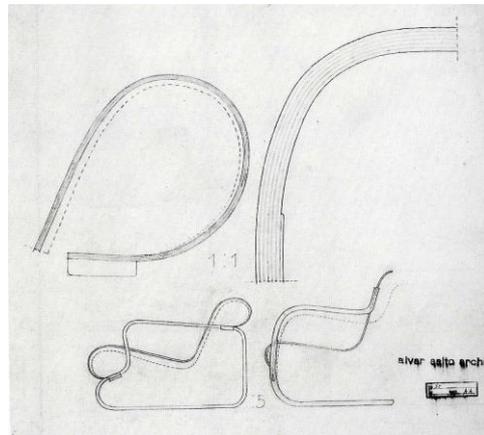
³⁰ Compare Heikkonen (Hg.): *Paimio Sanatorium Conservation Management Plan*, p.58. Further changes that were made according to the physicians wishes include the order of the physicians' offices, the shape of the operating theatre or the moving of laboratory and pharmacy from basement to ground floor. (compare *ibid.*, p.59)

³¹ Koskela, in: *ibid.*, p.60 "Luckily not all the alterations were accepted; for example, the cantilevered balcony wing without supporting pillars was considered expensive, but Aalto and Hartela succeeded in implementing the elegant design." *Ibid.*, p.60

easily met with existing lamp types.³² The 1931 "Paimio Chair", still produced by Artek today is, however, the most famous example.



Paimio chair



Construction plan detail
(image source: Reed, *Alvar Aalto*)

Aalto explains the design process:

"The flexible wooden furniture are a result of experiments also made at the Paimio Sanatorium. At the time of those experiments the first tubular and chromium surfaces are good solutions technically, but psycho-physically these materials are not good for the human being. The sanatorium needed furniture which should be light, flexible, easy to clean, and so on. After extensive experimentation in wood, the flexible system was discovered and a method and material combined to produce furniture which was better for the human touch and more suitable as the general material for the long and painful life in a sanatorium."³³

Although steel-tube furniture was part of "cutting edge" furniture design in the 1930s, it felt, according to Aalto, too cold and hard. Instead the plywood furniture which was at the same time "warmer" than steel and yet as easy to clean was more pleasant in "the long and painful sanatorium life."

It was the user's comfort and hygiene which was said to have dominated the design, with the particular angle "in the backrest to aid the patient's respiration"³⁴, and thus serving as an example for the successful collaboration between architecture, knowledge of the body and medicine. The first standardised wood furniture was thus developed with the declared goal, not only to produce light, flexible and easy to clean chairs, but to use material best suited for the requirements of the human body.³⁵

What came to be known as the "Paimio chair" was first exhibited at the Nordic Building Fair (Standard Furnishings exhibition) in Helsinki in summer 1932, even before Paimio itself had been inaugurated.

³² Paavo Tynell and his company Taito Oy were the partners here.

³³ Aalto, "The Humanizing of Architecture", in *The Technological Review*, Nov 1940, reproduced in Schildt 1997, 104

³⁴ Cuito, Aurora (ed.): *Alvar Aalto*, teNeues Publishing Group, Kempfen, Germany, 2002, p.8

³⁵ Eeva-Liisa Pelkonen, however, challenges the material narrative and doubts purely sensory reasons for choosing wood. According to Pelkonen "the impetus for using wood [...] originated from the protectionist policies introduced in Finland [...] during [the] economic recession. ("At that time, the Finnish government began taking a more active role in the co-ordination of trade agreements, including assigning special quotas for both exports and imports." (Pelkonen: p. 113))

[...] Bent-wood as a material had in this context the virtue of being both economical and thoroughly Finnish – it was made in its entirety of Finnish birch, not least because the importation of steel [...] became restricted." (Ibid, p. 113) Thus the material choice had the advantage to be appealing to the Finnish public and the government, ultimately Aalto's employer in the case of Paimio.

Together with the "Paimio Chair" also other pieces of Paimio furniture were presented in 1933 at the "Finnish Laminated Furniture" exhibition in London, which due to their serial production³⁶, could be "marketed under the slogans of value for money and comfort."³⁷ These pieces of furniture, specifically developed for the wellbeing of the human body would now be available also outside the realm of the medical environment and for the end-user at home.

The sanatorium's potential as a testing ground for the development of architectural standards had thus been embraced and fully realized.

Conclusion: Why Aalto?

Given the Paimio design process: Should we not value Alvar Aalto more as forerunner for evidence-based design?

Although Aalto's consideration for the patient as the centre of his design has been relentlessly repeated and one could also get the impression, that he invented the collaboration with the medical profession, this was actually not the case. Physicians had been traditionally the driving force of the sanatorium project or at least been involved in the planning. And also the psychological wellbeing of the patient was the central concern of sanatorium design from the time of its emergence in the 1860s.

A truly interesting contribution to innovative hospital design, however, is Aalto's methodological approach of using an "experimental room" where patients, doctors and architects would have the opportunity to develop design solutions together.

Instead of spending more and more time on the evaluation of user questionnaires³⁸, which often seem to state what we as architects (should) already know, instead of selling the idea of "patient empowerment" to clients on the basis that they were previously questioned about their preferred surface material, the "experimental room" seems to be a setting which would involve the user and medical expertise in the design process while at the same time taking advantage of architectural core competences instead of negating them.

As Ray Lucas critically observes: "Architecture has long been a discipline that looks out to others in order to find methods and ideas, but this can sometimes neglect the practice of architecture itself."³⁹

Instead of running danger to enter pseudo-scientific terrain (producing design based on "credible or liable" data and on often questionable sample sizes), we should therefore focus on the strengths of the discipline and encourage the development of a research framework, which takes advantage of / acknowledges the intuitive and creative element in the architectural design process.

As it is promoted today, evidence-based design might be useful to evaluate and to a degree, also to improve space, but can it be really seen as a tool to significantly progress architectural design and foster innovation?

Looking at the design process of Paimio, I wished to demonstrate, that the sanatorium offered, maybe even more than the hospital, a space for the rethinking of architecture. It could be even seen as "a kind of 'laboratory' for the testing of new ideas, which were then extended to the whole of urban space."⁴⁰ As such it is worth to look not only at Paimio but also at much earlier examples of hospital and sanatorium architecture, to benefit from earlier architectural research and experimentation which has been currently forgotten.⁴¹

³⁶ The seat was produced in a special mould that allowed production of numerous variants. Aalto collaborated on the furniture with Otto Korhonen, a Turku-based furniture maker.

³⁷ Ehrström, a.o.: p.19

³⁸ Is the medium of the questionnaire not altogether unsuitable to debate space?

³⁹ Lucas, Ray: *Research Methods for Architecture*, p.190

⁴⁰ Wallenstein: p.30

⁴¹ If we were willing to investigate our own disciplinary heritage, we would find that it is exactly not, as Diana Anderson claims, that "in the past only modest attention was given to providing surroundings that calmed

If we aimed again at true innovation, if we allowed designers to have more confidence in their own expertise (and this is most certainly something to learn from Alvar Aalto), the idea of hospital furniture finding its way back to our living rooms might not sound so absurd anymore.

The question should therefore not be how to bend and squeeze our projects into an existing framework valid for other professional contexts in order to gain access to new funding streams and to regain (supposedly) lost authority and trust from our clients. Rather we have to ask how to „produce research that is distinctively architectural in nature“⁴², since, to end with Aalto: “architecture is not a science.”⁴³ It is still the great synthetic process of combining thousands of definite human functions, and remains *architecture*.“⁴⁴

BIBLIOGRAPHY:

Aalto, Alvar, M. M. Sukkinen, Ilmo Kalkas, (Eds.): *Varsinais-Suomen Tuberkuloosiparantola*, Kirjapaino Polytypos, Turku, 1933

Aalto, Alvar: “The Humanizing of Architecture” (1940); in Göran Schildt: *Alvar Aalto in his own words*, Otava Publishing Company, LTD. Helsinki, 1997

Anderson, Diana: “Humanizing the hospital: Design lessons from a Finnish sanatorium”, CMAJ, August 2010

Blandine Barret-Kriegel: “L’hôpital comme équipement”; in: Mardaga, Pierre (Ed.): *Les machines à guérir (aux origines de l’hôpital moderne)*, Architecture + Archives, Bruxelles, Liège, 1979 (pp19-30)

Blundell Jones, Peter: “The hospital as building type”; in: *The Architectural Review*, London, March 2002, (p.42, 43)

Cuito, Aurora (ed.): *Alvar Aalto*, teNeues Publishing Group, Kempen, Germany, 2002

Dye, Anne and Flora Samuels (Eds.): *Demystifying Architectural Research: Adding value to your practice*, RIBA Publishing, Newcastle, 2015

Ehrström, Margaretha, Sirkkaliisa Jetsonen, Tommi Lindh: *Nomination of Paimio Hospital for Inclusion in the World Heritage List*, National Board of Antiquities, Helsinki, 2005

Eylers, E.: “National Identity through the International Style: Alvar Aalto’s Paimio Sanatorium and its Role for Finland”; In: R. Quek, D. Deane, S. Butler (Eds.), *Nationalism and Architecture*, Ashgate Publishing, 2012 (pp. 199-211)

Eylers, E.: “Planning the Nation: the sanatorium movement in Germany” *The Journal of Architecture*, 19 (5), 2014 (pp. 667-692).

Fraser, Murray (ed.): *Design Research in Architecture* (2013)

patients and addressed their emotional needs.” (Anderson, p.535) It would be in this context well worth spending time on early, even pre-modern ideas of hospital and sanatorium design where we often find a truly holistic approach towards the body.

⁴² Ray Lucas: *Research Methods for Architecture*, p.8

⁴³ Although Aalto welcomed experiments to inform the design process, he refused the idea of architecture turning into a “pure science”.

⁴⁴ Aalto: “The humanizing of Architecture”, in: Schildt, p.103. Although Aalto welcomed experiments to inform the design process, he refused the idea of architecture turning into a “pure science”.

Giedion, Sigfried: *Raum Zeit Architektur Die Entstehung einer neuen Tradition*, Birkhäuser, Basel, Boston, Berlin, 2000 (1941)

Heikkonen, Nina (ed.): *Paimio Sanatorium Conservation Management Plan*, Alvar Aalto Foundation, Helsinki, 2016.

Groat, Linda and David Wang: *Architectural Research Methods* (2013)

Koch, Robert: "The current state of the struggle against tuberculosis", Nobel Prize lecture from 1905, Nobel Lectures, Physiology or Medicine 1901-1921, Elsevier Publishing Company, Amsterdam, 1967

Lucas, Ray: *Research Methods for Architecture*, Laurence King Publishing Ltd, London, 2016

Nerdinger, Winfried (ed.): *Alvar Aalto, Towards a Human Modernism*, Prestel Verlag, Munich, 1999

Nightingale, Florence: *Notes on Hospitals*, John W. Parker & Son, London, 1859

Norri, Marja-Riitta (ed.): *ALVAR AALTO IN SEVEN BUILDINGS Interpretations of an Architects Work*, Museum of Finnish Architecture, Helsinki, 1998

Pallasmaa, Juhani: "Alvar Aalto: Toward a synthetic Functionalism"; in: Reed, Peter (ed.): *Alvar Aalto, Between Humanism and Materialism*, The Museum of Modern Art, New York, 1998, p.20-45

Pelkonen, Eeva-Liisa: *Alvar Aalto, Architecture, Modernity, and Geopolitics*, Yale University Press, New Haven and London, 2009

Pevsner, Nikolaus: *A History of Building Types*, 1970

Ray, Nicholas: *Alvar Aalto*, Yale University Press, New Haven and London, 2005

Teyssot, Georges: "Norm and Type. Variations on a theme", in: Picon, Antoine and Ponte, Alessandra (eds.): *Architecture and the sciences*, Princeton Papers on Architecture Princeton Architectural Press, New York, 2003

Wallenstein, Sven-Olov: *Bio-Politics and the Emergence of Modern Architecture*, the Buell Centre / Forum Project and Princeton Architectural Press, New York, 2009