

THERMAL COMFORT IN THE VIIPURI LIBRARY

Emmanuelle Gallo

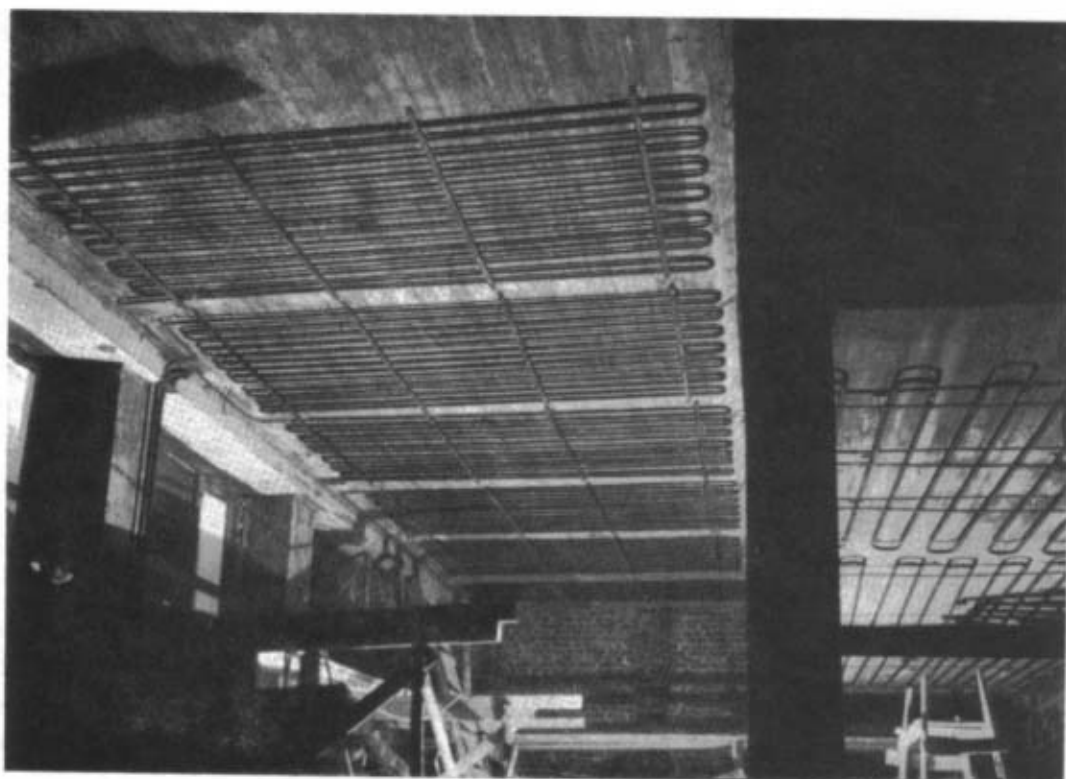
Before visiting Vyborg for the Docomomo Technology Group seminar, I had never considered writing about a building and architect I had never worked on previously. However, the visit to the library and Gerard Willemense's presentation on the drainage and ventilation problems, together with his own proposals to improve the situation, inspired me to write this short overview of the building's thermal comfort.

What we know of the original state

The architect Alfred Roth, a close friend of Alvar Aalto, included the Viipuri Library in his book *The New Architecture* in 1939. He provided many technical details: "The following rooms are heated by ceiling panels: loan department, reading and periodical room, newspaper room, children's library and entrance hall. The other rooms, including the lecture room, are heated by ordinary radiators." [i.e. ideal standard, "Classic" radiators].¹ According to Roth, the engineer C. Rosenqvist was in charge of the heating and ventilation systems, working for the firm Ekono, which used this building as an advertisement for its products. Radiant heating from above was indeed appropriate for the building's function, since the walls are taken up by bookshelves and cannot be fitted with radiators.² At the time of the building's construction, radiant heating was recommended by thermal engineers for places where people partake in physical activities, including libraries, even if in the 1930s, when such heating systems were still infrequent, this advice was theoretical rather than empirically tested.³ In the basement plans for the building one can see a heating chamber with three boilers and another room with three pumps, as well as a large storage for coal and a chimney in the corner of the reading room terrace. The unusual thickness of the external walls (75cm) permitted insulation (without more details) and the passage of ventilation conduits (glazed stoneware pipes) and rainwater downpipes. The plans show two kinds of ventilation duct: round ones for fresh air coming from the ventilation plant located in the cellar, and larger rectangular ones for the air flowing out to the roof. The openings of the latter conduits are visible in the photographs of the lending hall and reading and periodical room at the upper level of the external walls. A freehand sketch, reproduced in the Getty Foundation Report, illustrates the circulation of the fresh air from the vent at the upper level of the walls to other levels.⁴ Outlet vents just above the shelves are evident in photographs. These spaces have been slightly over pressured. We do not know if the air was lightly heated in the basement before circulation, although radiant heating was sufficient to maintain comfort with fresh air.⁵ According to the presentation of Rosenqvist, the lecture hall and book storage were minimally heated.⁶

The destruction and first renovation

No particular information exists about the destruction of the heating and ventilating systems during the war and the following period of disuse.⁷ As the foundations are intact and the inner and outer brick walls were only slightly damaged, it is possible to imagine that this system is still present: 40% of the concrete roof was destroyed and it



Panel-heating putkisto asennettuna nuortenosaston lukusalin katossa

foto th nyblin

Viipurin Kaupungin uusi kirjastotalo on varustettu säteilylämmityslaitteilla, joiden suunnittelun ja valvonnan on suorittanut

EKONO
VOIMA- JA POLTTOAINETALOUDELLINEN YHDISTYS

Helsinki, Unioninkatu 15

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Advertisement in the pamphlet "Viipurin Kaupungin Kirjasto", 1935.

is possible that the pipes inside were damaged. The transcription of a discussion between architect Aleksandr Mihailovitch Shver, Library Director Tatiana Vladimirovna Svetelnikova and the Finnish Committee for the Restoration of the Viipuri Library in April 2002 sheds some light on the condition of the heating system: "I don't see much of a problem regarding heating. Of course, all the plaster was taken down and all pipes in the ceiling were partly repaired. Anyway, they were installed where Aalto had them, according to the pattern of his pipes. Plaster was taken down."⁸ During this meeting, Shver pointed out that the heating room was still functioning (in its original state?) in the 1960s. A part of the pipes was renewed during the Soviet period. Shver also wrote: "It was more difficult with ventilation, because it was so complicated to fine-tune. The system of ventilation here is so difficult for our engineers to understand, and there were no blueprints, so all of this was done intuitively."⁹ In the reading room, we can still notice the air vents at the upper and lower levels, even if this system is actually out of order.

District heating

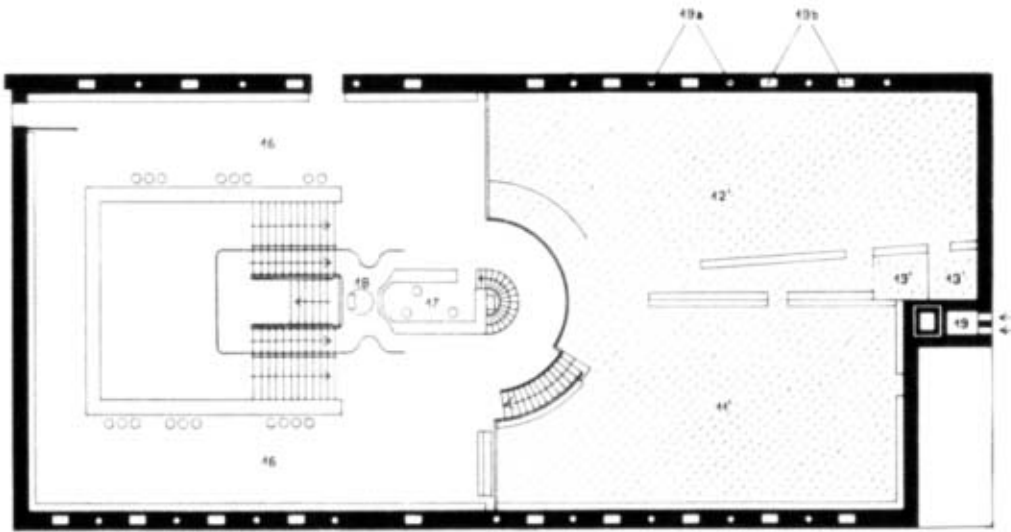
In the same discussion, Shver says that "the heating room was closed only relatively recently" – which, in fact, is incorrect.¹⁰ Today the building is connected to the town heating network. District heating, which appeared in North America at the end of the nineteenth century, was introduced in Russia in the 1920s, and greatly developed in Communist countries after the Second World War.¹¹ This system is often economical and ecological, but creates a total dependence. Space is saved inside the building and, in the case of Aalto's library, the coal storage was planned to become an additional book stack, but in practice it was too damp. The current inefficiency of the heating in the reading room may be caused by an inadequate quantity of hours of heating production or a shortcoming of power delivered by the notoriously unpredictable Vyborg district heating system.¹²

Recent studies and restoration

The Getty Report traces the different restorations, and the renovation of the heating and hot water system during 1999-2000.¹³ All existing radiators are Soviet, and a part of them was renewed in the 1990s. Preliminary studies were made in the 1990s by Ekono, the original heating and ventilation designer company.¹⁴ In the Getty Report there are also references to heating pipes in the ceiling, an observation consistent with Alfred Roth's book. Drawings of the ventilation pipe-covers above the hall exist, as do photographs of radiators in other places, such as corridors and upper level offices.

Heating and the construction of sensations

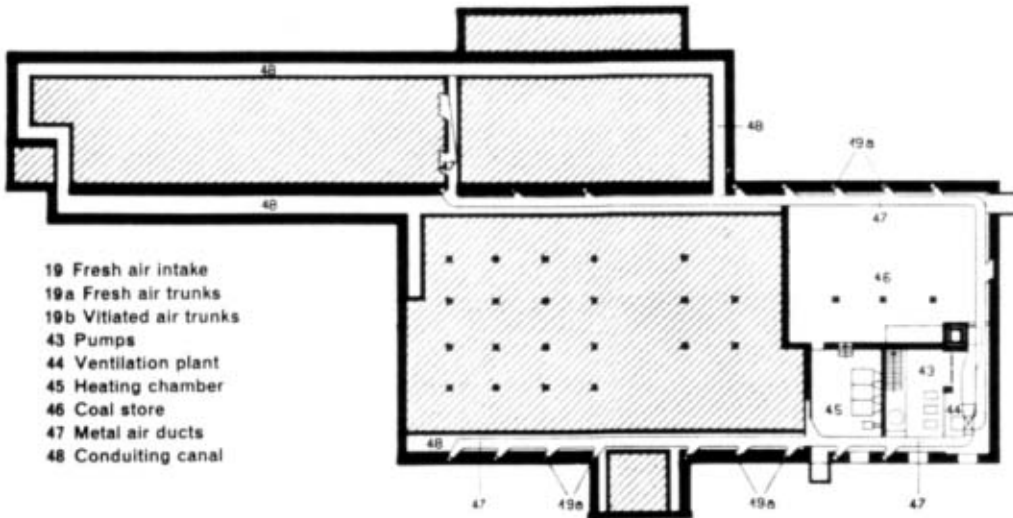
Aalto's idea that natural light and heat should come from above the seats of the readers is seductive, and even sensual, just like the sun on our skin. The heating in the ceiling was certainly supposed to keep the breathing space inside the double slab roof in a salubrious condition and prevent condensation on the skylights, a kind of "active" insulation of the roof. Radiant heating is an obvious reference to the Roman hypocaust systems with their warm floors and ventilated walls. Hypocausts were well known in the nineteenth century due to archaeological excavations and publications.¹⁵ Aalto may have learned about these systems during his frequent trips to southern Italy (e.g. Capri), and through the main heating literature often referring to the Roman period. We may thus



- 11 Reading room
- 12 Periodical room
- 13 Rooms for private study

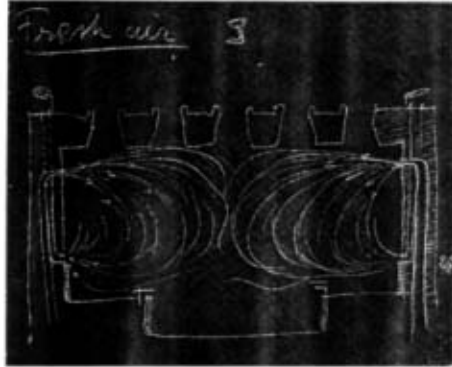
- 16 Loan section
- 17 Control
- 18 Waste paper basket

- 19 Fresh air intake
- 19a Fresh air trunks
- 19b Vitiated air trunks



- 19 Fresh air intake
- 19a Fresh air trunks
- 19b Vitiated air trunks
- 43 Pumps
- 44 Ventilation plant
- 45 Heating chamber
- 46 Coal store
- 47 Metal air ducts
- 48 Conduiting canal

Alvar Aalto Library,
Vyborg
above: Cellar plan
below: Soussol plan



interpret the Viipuri Library as a modern and successful reinterpretation of the heating technology of antiquity. Aalto's sensualist design not only featured the radiance of light but also the radiance of heat from the same source: the ceiling. The library users were thus bathed in light and warmth.

Notes

1. Alfred Roth, *The New Architecture, 1930-1940*, Engelarch, Zurich, 1939 [book published in French, German and English].
2. From the nineteenth century, libraries were often heated by hot air, which is not as comfortable as radiant heating with fresh air.
3. André Missenard, "Convection et rayonnement", *Architecture d'Aujourd'hui*, mai 1935, p. 36. This particular issue of the journal was dedicated to heating and ventilation. The polytechnician Missenard won the famous German Rietschel Prize in 1938 for his works on ambiance temperature.
4. *Project Preparation Work for the Conservation of the Alvar Aalto Library in Vyborg*, *The Getty Grant Program Report*, The Finnish Committee for the Restoration of Viipuri Library, 2001, p. 50.
5. With still air, the ambient temperature is proportional to the sum of the air temperature and the average of the radiant temperatures.
6. C. Rosenqvist, "Viipurin Kaupungin Kirjasto", post-implementation pamphlet, 1935.
7. We have to keep in mind that the building was not used as a library for ten years after the war, just as a "storage" for the suffering city.
8. Kirsti Reskalenko and Liisa Roberts, Edited by Gregor Neuerer, *Untitled (Experience of Place)*, Verlag der Buchhandlung Walter König, Köln, 2003.
9. They may have understood the old system, but have other reasons to neglect it.
10. *Untitled (Experience of Place)*, p. 80.

11. Sven Werner, *Fjärrvärmens utveckling och utbredning*, Värmeverksföreningen, Stockholm, 1989, p. 79.
12. The Finnish Committee for the Restoration of the Viipuri Library has for at least ten years proposed for safety reasons using a heat exchanger for the library, but it seems to be difficult for the local authorities to accept.
13. *The Getty Program Report*, p. 4.
14. Information given by Tapani Mustonen.
15. Gustav Fusch, *Über Hypocausten-Heizungen und Mittelalterliche Heizungsanlagen*, 1910, p. 117.

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Emmanuelle Gallo is an architect, an art & culture philosopher and a historian of contemporary architecture. After a period of architectural practise, she taught history of architecture, construction design, and the history of construction in several institutions, such as l'Institut d'art de l'Université de Paris I. She is currently completing a dissertation on the history of heating in lodgings in France. She has published papers on the history of architecture, the history of heating, and a book on the history of a 19th-Century palace in Normandy, France, in connection with an exhibition. Emmanuelle Gallo is one of the founder members of DOCOMOMO France, a member of the DOCOMOMO ISC/Technology since 2002 and webmaster of DOCOMOMO International.