

Eastern's MOVABLE PARTITION SYSTEM

... accessible and completely
salvageable wall installation



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(London/Zurich)

The Blind Spot

As we scroll through Instagram or Dezeen contemporary architecture is presented in carefully angled photographs, composed to mediate ideas about buildings that render certain aspects invisible. Absent from the presentation of modern architecture is any acknowledgment of its maintenance, eventual obsolescence or its dependence on a constellation of technical installations, materials, and expertise. What we now understand as architecture is less a spatial or a tectonic task based on aesthetic principles, but as was defined in the nineteenth century, the act of forming closed environments, with substances, energy, and people quantified into very precise programmes. This essay considers these environments, problematising them through the invisible technologies that enable their enclosure and considering how these concerns affect our experiences of the world.

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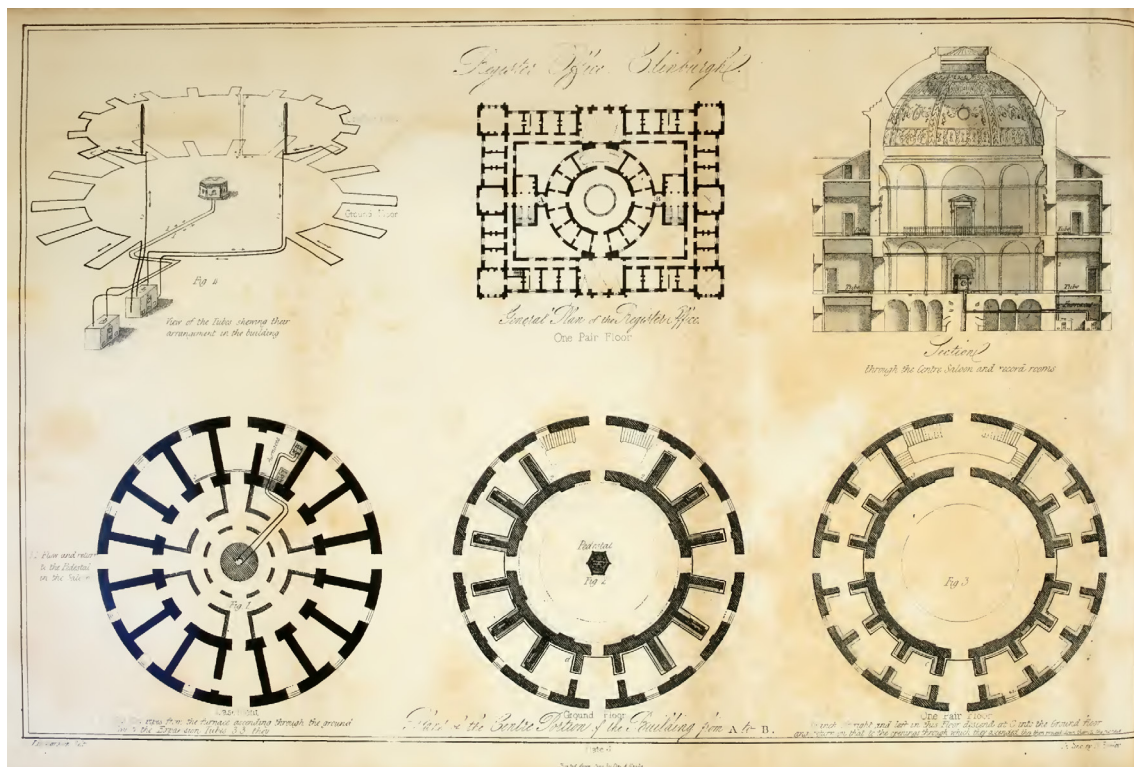
The rear view is absent in the mediation of contemporary architecture. As we scroll through Instagram or Dezeen each new building is presented in carefully angled photographs. These images are composed to mediate normalised ideas about architecture and about modern life that render certain aspects invisible. What are these aspects and why is their invisibility significant?

Absent from the presentation of modern architecture is any acknowledgment of its maintenance and eventual obsolescence; any discussion on its reliance on low-cost labour in both design and construction, or its dependence on a constellation of technical installations, materials, and expertise. Pivoting around the notion of performance, this later point seems to be the most vital one when considering the absence of rear view.

We can see this most clearly in the structural design of contemporary architecture. At the turn of the twentieth century the adoption of new construction techniques, especially steel frames, dislodged the wall from its functional primacy as the bearer of structure, organiser of space, and the enclosure of the interior. Modern architecture was defined as the act of forming closed interiors or artifi-

cial environments rather than an art form based on tectonic or aesthetic principles. In the nineteenth century, the internal organisation of buildings changed with the development of sanitary and heating systems as well as the introduction of new circulatory devices. César Daly, in his study of Charles Barry's Reform Club in London, called the Neo-Florentine building "modern", not due to its style or its programme, but because the heating, ventilation, and communication systems made the private members club a closed environment.¹ We can see, at this moment, the combination of two genealogies. First, one that aimed to quantify the substances (air, water, waste, gas) that circulated within the fabric of a building. Ever since, buildings and cities have featured an invisible network of pipes and shafts. Reporting on the English country house, Hermann Muthesius noted how domestic architecture was both formed from and reliant on networks of pipes of every type – hot water, for heating, for electricity – to such an extent that English houses "resembled complex organisms with arteries, veins, and nerves like the human body".² Another commentator noted in 1910, "widely ramified arteries throughout every floor of the building, of which the outside observer is totally unaware". From this place there emerged a

Fig. 1. "The method of warming at the Register Office, Edinburgh". Source: C. J. Richardson, *A Popular Treatise of the Warming and Ventilation of Buildings*, London, 1839, Plate 3.



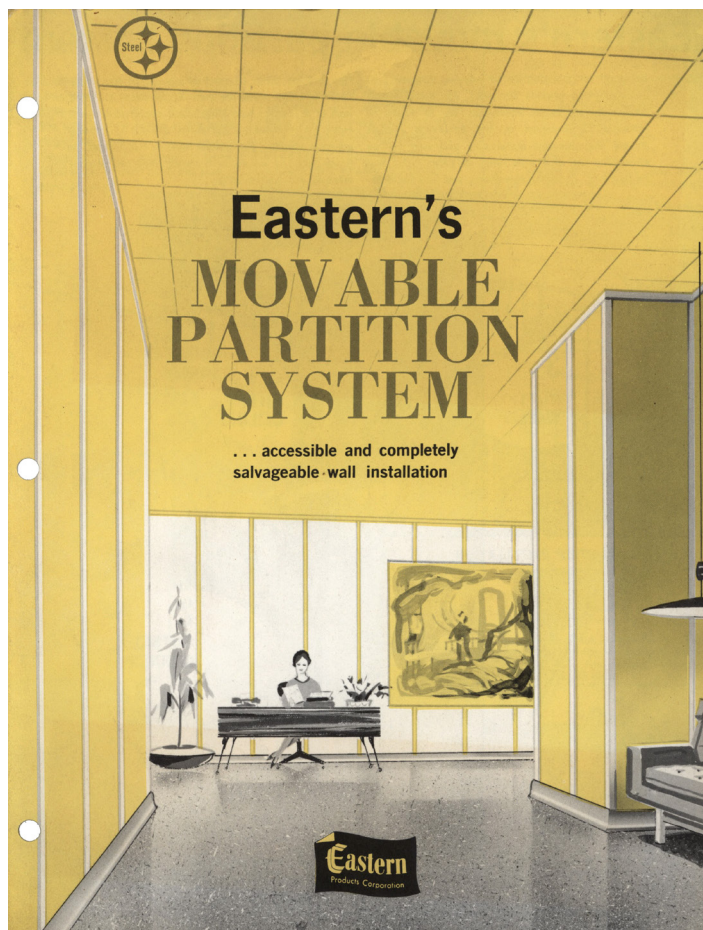


Fig. 2. "Eastern's Movable Partition System", brochure for Eastern Products Corporation (1960). Courtesy Tulane University, Howard-Tilton Memorial Library, Southeastern Architectural Archive.

physical distinction between the structural and non-structural elements of the building. (fig.1)

Connected to the distinction was the second genealogy, which through the deployment of refined technologies like iron and glass, allowed for complete programming of rooms, buildings, and the urban realm.

In the emergence of new building techniques and standardised products – combined with the need for each interior to be designed to house a particular series of activities – structure and enclosure were separated into a series of layers based on their performative role: structure, insulation, ventilation, and lighting. Often the superimposition of these layers rendered their exact performative roles invisible. Whilst the steel or concrete frame supported the floor of a building and the curtain wall provided enclosure and lighting, the various functions of a building still needed to be defined spatially for reasons of privacy, practicality, and thermal performance. Although invented in America at the end of the nineteenth century, plaster-

board (or drywall) partitions became a standard trope for the cellular layouts of modern buildings in Europe. Constructed from a layered sandwich of wool felt, paper, and plaster sheets, fixed to timber or metal studs, from the mid 1940s the benefits in the speed of its construction allowed for new developments in prefabrication, fire-proofing, and isolation of the various building elements. Here the wall is not load bearing, decorative, or unique. Permeated with electrical wiring, pipes, and conduits, panelised into standard sizes, and filled with acoustic insulation, a plasterboard partition as a composite whole allows the modern building to function in terms of spatial organisation and flexibility while remaining invisible in its role. (fig. 2)

This concealment is not restricted to the wall but occurs in other parts of the building, especially the suspended ceilings which hide plenums for the services above. (fig. 3) The improvement of ventilation in buildings was seen as one step towards improving public health in the late nineteenth century. The control and distribution of air throughout a building became one of the central challenges of the architect. In Britain during the Interwar period the therapeutic effects of fresh air were prioritised, encapsulated by Tecton's presentation drawings of Finsbury Health Centre (exhibited at the local town hall in 1938) with flowing arrows signifying the cross ventilation enabled by the open-plan floors of the modern building above ground, while a force-extract flue system allowed the basement level to expunge air when necessary. Alongside air, sound caused by the activities of a building's programme was suppressed. At the Paimio Sanatorium (1929–33), for instance, Aino Aalto designed a washbasin for each patient's room, angled at 45-degrees to minimise the noise caused by the flow of water that might disturb the neighbouring patients in adjoining rooms.

Subsequently in postwar avant-garde architects became increasingly interested in space delimited not by solid elements but, as outlined by Peter Sloterdijk, closed interiors formed by the climatic boundaries of their environment.³ We only need to think of

Fig. 3. "Details of suspended ceiling". Source: H. B. Newbold and E. Lucas, *Modern Practical Building*, London, 1950, III, p. 72.

when they may be nailed to the forking piece either downwards at an angle from the top, or from the sides also at an angle.

Where ceiling joists come above wood-framed partitions they are rested on the 4 × 3-inch head of the partition, and the ceiling joists for adjacent rooms should be lapped and nailed together through their sides ;

DETAILS OF SUSPENDED CEILING.

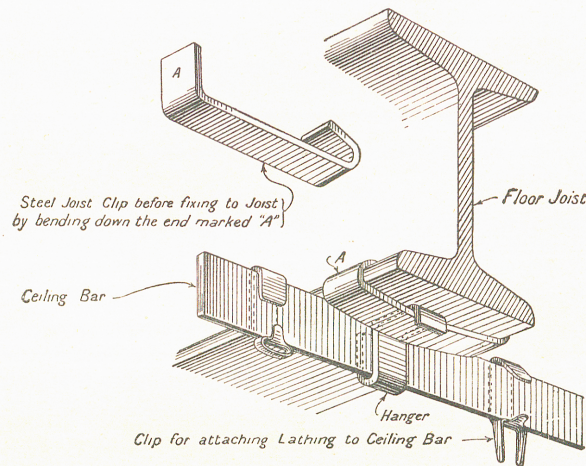


Fig. 51.

or where one of the adjacent rooms is of small width, the ceiling joist may be continuous across both spans resting on the partition head and being nailed thereto.

PARTITIONS

Where the divisions required by the plan accommodation cause walls to be built over rooms below, partitions are framed in timber. In cheaper construction the divisions of downstairs rooms may also be of wood-framed partitions, but this is rarely so in modern work.

Where there is a second storey above the first-floor ceiling, the division is carried up by means of a framed partition vertically over the one below, and the upright timbers forming the dividing partitions on both storeys may be in single length, as is explained later.

Timber-framed partitions are classified as follows: (1) common partition; (2) framed or braced partition; (3) trussed girder partition for two storeys; (4) brick-nogged partition.

Alison and Peter Smithson's House of the Future (1956), with its curved walls designed to facilitate the movement of air. Hidden within these walls were the house's technical devices and appliances. In practice however, a series of proprietary systems emerged from which to hide the technical equipment required to form an environment. In the early 1950s fabricators began to patent suspended ceilings with modular grid systems that would hide heating, ventilation and air conditioning services, electrical wiring, and various pipes.⁴ While historians have often seen this as a purely American issue related to a culture of post-war corporate architecture, companies like Zent-Frenger or Deutsche Philips in Germany, or the Celotex subsidiary in Great Britain produced metal-frame tile systems whose ordered grids rationalised the mess of equipment re-

quired to service the modern interior. Through its expression in grilles, sprinklers, and light fittings the ceiling abstracts the complicated technologies that it conceals, providing a new sort of architecture for its inhabitants, whether the program was an apartment building or hospital, school or cinema. (fig. 4)

What happens when these inhabitants needed to interact with the technics inside buildings? Buttons and switches operate elevators, apps and other programs control heating systems and electrical lighting. Early-modern technologies were based on mechanical models which gave users the immediate feeling that they were producing the intended effect, as a bell would ring, or a lathe would cut. Instead the emergence of the button as the activator in a system removed

Fig. 4. Gunnar Frenger: "Die Zent-Frenger-Strahlungsheizdecke".
Source: *Schweizerische Bauzeitung* 71 (1953), No. 30, p. 436.

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SCHWEIZERISCHE BAUZEITUNG

71. Jahrgang Nr. 30

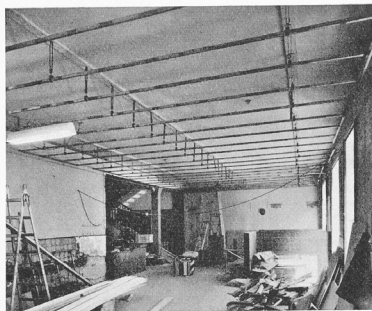


Bild 1. Raum mit aufgehängten Heizrohrregistern, bereit zur Montage der Deckenelemente.

In den bisher am meisten angewandten Systemen wird als strahlende Fläche die Raumdecke benötigt. Das Heizwasser zirkuliert in Rohren, die direkt im Beton oder Gips der Decke eingebettet sind. Diese Strahlungsheizungen stellen zweifellos einen sehr grossen Fortschritt im Heizungswesen dar. Sie haben weite Verbreitung gefunden. Die steigende Bedeutung der Lärmbekämpfung hat zu einer stark vermehrten Verwendung von Schallschluckdecken geführt. Diese können aber mit den bisher üblichen Strahlungsdecken nicht oder nur mangelhaft kombiniert werden, da durch sie die Wärmestrahlung reduziert wird. Auch für eine Kombination mit der Ventilation eignen sich die Strahlungsdecken mit eingegossenen Rohren nicht gut, während sich eine Kombination der Schallschluckplatten mit zugloser Ventilation leicht erzielen lässt. Je nach Wichtigkeit der Schallschuckung oder der Ventilation musste deshalb in vielen Fällen auf die an und für sich erwünschte Strahlungsheizung verzichtet werden.

Nachfolgend sei die Entwicklung des nach mir benannten Systems beschrieben, das eine Kombination von Strahlungsheizung, Schallschuckung und zugloser Ventilation darstellt, und das sich auch sehr gut zur Strahlungskühlung eignet. Ich möchte dabei hervorheben, dass die Frenger-Decke nicht allein mein Werk ist; tüchtige Ingenieure in vielen Ländern haben mit mir zusammengearbeitet und mir zu meinem Erfolg verholfen. Das Frenger-System ist das Ergebnis meiner jahrelangen Erfahrungen im Bau von Strahlungsheizungen und von unablässigen Versuchen, diese Heizungsart zu verbessern. Das System ist heute durch viele Patente in der ganzen Welt geschützt, und seine Verwendung macht überall rasche Fortschritte.

In erster Linie ging es darum, eine möglichst rasche und genaue Anpassung der Heizleistung an den jeweiligen Wärmebedarf zu erreichen. Als Material für eine ideale Strahlungsdecke erwies sich schon bei den ersten Versuchen Aluminium als der am besten geeignete Werkstoff. Aluminium ist einer der besten Wärmeleiter. Das grösste Problem war aber, eine Aluminiumdecke zu entwickeln, die leicht zu fabrizieren, ein-

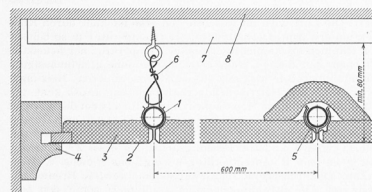


Bild 3. Querschnitt durch eine Frenger-Decke. 1 Heizrohr, 2 perforierte Aluminiumplatte, 3 Isolierung, 4 Randleiste, 5 Klammer, 6 Aufhänger, 7 Tragleiste, 8 Decke.

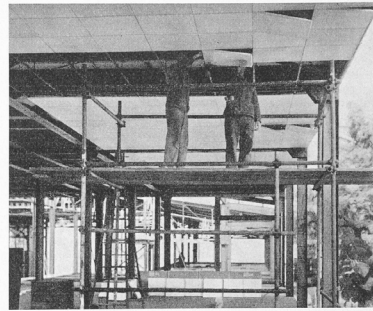


Bild 2. Montage der Deckenelemente im ALCOA-Building in Pittsburg, USA, wo insgesamt 22 500 m² Frenger-Decken montiert sind.

fach zu installieren und mit den Rohren in einwandfreie Wärmeverbindung zu bringen war. Nach langen Versuchen gelang es, eine Lösung zu finden, die sich für eine rationelle Montage und zugleich industrielle Massenproduktion eignet. Die Versuche nach dem ursprünglichen Entwurf begannen im Jahre 1944. Im Jahre 1945 war die erste Frenger-Decke für Strahlungsheizung und -Kühlung im Betrieb. Die Versuche lieferten die Grundlagen für die sichere und einfache Berechnung der Hauptgrössen dieses Systems.

Die neue Decke besteht aus viereckigen Aluminiumplatten, die in metallenen Kontakt mit einem Rohrnetz gebracht werden. Die Rohren werden zuerst zu Registern zusammengeschweisst, die dem Raum angepasst sind. Alsdann hängt man die Register 8 bis 10 cm unter der Decke auf und verbindet sie miteinander, so dass sie ein vollständiges Netz bilden, das von der Hauptleitung der Heizung gespeist wird. Die Rohren weisen einen stets gleichen Abstand voneinander auf; er beträgt normalerweise 60 cm. Die Platten sind aus 0,75 mm dickem Aluminiumblech hergestellt, 60 x 60 cm gross, an der Unterseite matt-weiss gestrichen, oben metallblank und in der Regel mit Schallschlucklöchern versehen. Die Plattenränder sind gegen oben umgebogen, so dass sie sich den Rohren gut anpassen und mittels Metallklammern in engen Kontakt mit den Rohren gebracht werden können, wodurch eine gute Wärmeleitung vom Rohr auf die Platte erreicht wird. Die Platten können dank der praktischen Ausbildung der Klammern sehr leicht an das Rohrnetz montiert und wenn nötig wieder weggenommen werden. Um die Wärmestrahlung nach oben zu verhindern, werden die Platten und Rohre mit einer Isolierung bedeckt, die gleichzeitig schallschuckend wirkt. Die Frenger-Decke erzielt dadurch die gleiche Wirkung wie eine gute Akustik-Decke (Bild 4).

Die Rohren dienen als Leiter für die Heiz- bzw. Kühlflüssigkeit, sowie als Aufhängevorrichtung für die Platten. Die Rohrregister der Frenger-Decke erhalten normalerweise die gleiche Temperatur wie das Heizungswasser bei Radiatorenheizung. Das Rohrnetz der Frenger-Decke kann also an das

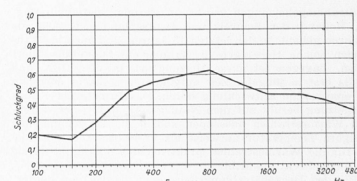


Bild 4. Schallschluckradkurve bei einem Deckenabstand von 100 mm und einer Lochfläche von 4,7 % (aus EMPA-Bericht Nr. 45 107).

the quantitative relationship between cause and effect, user and mechanism. The push button emerged in the elevators of apartment and office buildings in Berlin and Paris at the turn of the twentieth century. Previously reliant on a human operator and visible mechanical controls, the push-button system – electrical connections, control apparatus, motor – disappears to the rear of the scene. Hidden behind a fascia only the push button itself is visible to a user, the button seemingly responsible for the transit of passengers from floor to floor. Any directional analogy between system and the user's motion is omitted: the button for "up" feels exactly the same as the button for "down". This technologization makes the actions of humans increasingly unspecific with technical processes removed by proxy into the realm of concealment, hidden in the rear view.

Why is the rear view such a blind spot in how we consider and consume contemporary architecture? One hypothesis is that it hides the manipulation of on-going processes confined within buildings. These processes are almost all related to the rationalisation of society (and in particular labour) through the built environment by controlling space, regulating the temperature, and controlling light. In the rear view, that space between and behind the suspended ceiling, the push button, and the partition wall we can observe the alteration and condensation of architecture into a territory defined by a new set of borders, a new way of living, and the foundation for modern life.

Notes

- 1 César Daly: "Reform-Club: Club de la Réforme (Londres)." In: *Revue générale d'Architecture* 15 (1857), pp. 342-348.
- 2 Hermann Muthesius: *The English House*. trans. Janet Seligman. New York 1979, p. 163.
- 3 Peter Sloterdijk: "Insulations: For a Theory of Capsules, Islands and Hothouses." In: *ibid.*: *Spheres*. Vol. 3: Foams Plural Spherology. Cambridge, Mass. 2016, pp. 287-340.
- 4 Cf. Reinhold Martin: "Acoustic Tile as a mediating technology of organization." In: Timon Beyes, Robin Holt, and Claus Pias (eds.): *The Oxford Handbook of Media, Technology, and Organization Studies*. Oxford 2020, pp. 15-25.