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## Radio as Architecture: Notes toward the Redefinition of the Berlin Walls Alfredo Thiermann

"Walls are the armoury that preserves our personal integrity against the inroads of the rest of humanity and nature,"<sup>1</sup> Robin Evans writes in an essay about walls published in June 1971. In the essay, Evans proposes a reading of that fundamental element—the wall—under the light of an "environmental history of the war against information."<sup>2</sup> Here, architecture is understood not as buildings, necessarily, but as delineated terrains, artificially manufactured by the material qualities and geometric dispositions of walls—from the Great Wall of China to the aesthetic retreat designed by Jean Des Esseintes, protagonist of the canonical novel *À rebours* by Joris-Karl Huysmans. Throughout Evans's analysis, walls are understood as mediations in "two distinct, but not mutually exclusive ways: retreat and exclusion."<sup>3</sup> Exclusion is the act of secluding a small portion of individuals outside of the "world." The walls of asylums, clinics, and prisons materially construct this form of exclusion. On the other hand, retreat is an act in which an individual or small group voluntarily secludes themselves from the "world" using walls, "circumscribing and forgetting about those parts of it that offend them."<sup>4</sup> But surprisingly, Evans does not mention the single most relevant wall of the time, built exactly a decade before the publication of his essay: the Berlin Wall. Whether voluntary or not, the omission leaves his argument partially incomplete, and today the questions underlying it have become more relevant than ever before. In an age where the presence, transaction, and exchange of information is ubiquitous—extending far beyond the limits of the planet but also deep within our bodies and penetrating almost every aspect of daily life—it seems relevant to reframe the historical problem of walls, limits, and information.

With a different sensibility and using a different medium, North American composer Frederic Rzewski chose to refer explicitly to the Berlin Wall. In a chronicle published in the Swiss magazine *Du atlantis*, Rzewski describes his experience commuting from one side to the other of divided Berlin, going—almost on a daily basis—to work on a musical piece commissioned by Berliner Rundfunk (Radio of Berlin) in 1965.<sup>5</sup> Rzewski, who was a fellow of the Ford Foundation in West Berlin, describes his daily routine as "the hardly-believable transition between two different worlds coexisting side-by-side."<sup>6</sup> His composition was meant to transgress precisely that radical juxtaposition—one constructed by the Wall—by being broadcast, through the electromagnetic field of radio, across all physical and political borders.

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<sup>1</sup> Robin Evans, "The Rights of Retreat and the Rites of Exclusion: Notes towards the Definition of Wall," *Architectural Design* 41, no. 6 (1971): 335–39, here 337.

<sup>2</sup> *Ibid.*, 335.

<sup>3</sup> *Ibid.*, 336.

<sup>4</sup> *Ibid.*, 335.

<sup>5</sup> The Berliner Rundfunk was a radio station established by the Soviet Military Administration and later adopted as a radio station in the German Democratic Republic.

<sup>6</sup> Frederic Rzewski, "Notizen zu 'Zoologischer Garten'" *Du atlantis* 26 (1966): 942–44, here 942. Translation by the author.



**fig.1** Subharchord synthesizer inside the Labor für akustisch-musikalische Grenzprobleme.

**7** See Gerhard Steinke, "Experimental Music with the 'Subharchord' Subharmonic Sound Generator," *Journal of the Audio Engineering Society* 14, no. 2 (1966): 140–44.

**8** Rzewski, "Notizen" (see note 6), 942. Translation by the author.

**9** The Labor für akustisch-musikalische Grenzprobleme was part of the Betriebslaboratorium für Rundfunk und Fernsehen, renamed in 1962 as Rundfunk- und Fernsehtechnisches Zentralamt (RFZ). The Betriebslaboratorium was established in 1949 (from 1949 to 1957 it had a different name) and was the research lab—dependent on the Ministry of Post and Telecommunications of the GDR—in charge of scientific research related to radio and television. For the history of the Labor für akustisch-musikalische Grenzprobleme, see Tatjana Böhme-Mehner, "Berlin was Home to the First Electronic Studio in the Eastern Bloc: The Forgotten Years of the Research Lab for Interdisciplinary Problems in Musical Acoustics," *Contemporary Music Review* 30, no. 1 (2011): 33–47.

**10** For the original composition, listen to Frederic Rzewski, "Zoologischer Garten: Einzelspuren auf zwei Kanälen," 1965, in Akademie der Künste, Berlin (AdK), Sammlung Audiovisuelle Medien (AVM), Tonbänder (AVM-31) 0825.1-2, 23'05." For the noise samples developed for the composition, listen to Frederic Rzewski, "Zoologischer Garten: Beispiele zum Geräuschkatalog," 1965, in AdK, AVM-31 0826.1-3.

The piece was meant to be broadcast on FM radio in 1966 in what would have been the first open electronic music concert in the German Democratic Republic (GDR). Had the piece been broadcast, its sounds—an original creation of the Subharchord synthesizer developed by East German engineer Ernst Schreiber in



1961—would have been a complete novelty for the listeners on both sides of the Iron Curtain: nobody had heard such sounds before. <sup>7</sup> Described by Rzewski as "one of the major advances in the field of electronic instruments" and as an "extension of the human body," <sup>8</sup> this artifact—which not only performed but also fabricated the sounds and thus the very medium of the composition—was developed at the Labor für akustisch-musikalische Grenzprobleme (Laboratory for Boundary Problems in Musical Acoustics), founded in East Berlin in 1956. <sup>9</sup> The synthesizer had been assigned a specific function: that of producing a new kind of sound through electronic synthesis and, with it, a new kind of acoustic space. **fig.1**

The resulting twenty-three-minute-long musical composition, titled "Zoologischer Garten," <sup>10</sup> is an ensemble of six seemingly unrelated fragments bound by the medium of magnetic tape and making explicit reference to the multiworld Rzewski experienced in Berlin, thus providing a mysteriously precise commentary on the early effects of the Berlin Wall at the scale of the city. Based on the experience of being confronted with two radically different realities just by the act of crossing a wall, Rzewski recorded how the wall divided the city and simultaneously created contrasting proximities. At the same time, the technological, aesthetic, and political conditions under which the music was conceived were designed to make it transgress the agency of that very wall, going straight through it. Rzewski's composition



thus casts light over other walls, which have been long overlooked. By revealing the intricate relationship between buildings, synthetic sounds, and electromagnetic waves, the piece opens the door to a media-archaeology <sup>11</sup> of Berlin and its walls (including *the Wall*) in the age of radio, helping also to rethink and expand Evans's theory of retreat and exclusion. What follows is a reconstruction of what I call the *architecture of radio*, exploring the ways in which walls, broadly understood, can construct spaces, and how ideas of space and sovereignty influence the conception of these walls in an age where the historic solidity of architecture has been challenged by the radical effects of radio.

<sup>11</sup> See Wolfgang Ernst, *Digital Memory and the Archive* (Minneapolis: University of Minnesota Press, 2013), 55–73.

**1** The beginnings of the *architecture of radio* can be traced to the intertwined but widely overlooked history of buildings built for radio broadcasting, starting in the Germany of the Weimar Republic. This history begins with the Großfunkstelle Nauen (Nauen transmitter station), commissioned to be designed by Herman Muthesius and completed in 1920, 40 kilometers west of Berlin. A few years later, in 1926, the Funkturm Berlin was completed after the design of Heinrich Straumer in the city's Westend. Portrayed by László Moholy-Nagy in 1928 as an emblem of the transparent, translucent, and apparently ephemeral modern times, the Funkturm was located on the Messegelände (exhibition grounds) planned by Martin Wagner and Hans Poelzig. Later, it was wired to a much more massive building across the street, the 1931 Haus des Rundfunks, also designed by Poelzig. <sup>fig.2</sup> During the Second World War, the Haus des Rundfunks worked in connection with another building, the Deutschlandsender III, located in Herzberg, 90 kilometers south of Berlin. The Deutschlandsender III was the single tallest structure in Europe – a 325-meter-high steel



**fig.2** Haus des Rundfunks seen from Masurenallee.

12 Gerd Klawitter, ed., *100 Jahre Funktechnik in Deutschland: Funkseestellen rund um Berlin* (Dessau: Funk Verlag Hein, 2004).

13 Albert Speer, *Inside the Third Reich* (New York: Simon & Schuster, 1997), 275.

fig. 3 Deutschlandsender III in Herzberg.

14 Charles I. Bevans, ed., *Treaties and Other International Agreements of the United States of America, 1776–1949*, vol. 3 (Washington: Department of State, 1969), 1, 124.

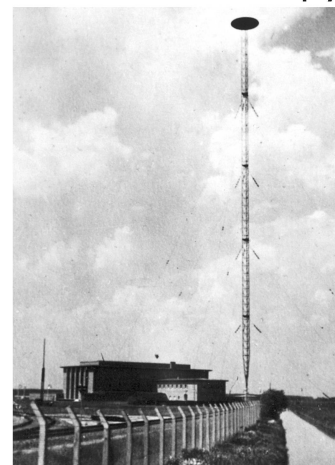
15 Christopher Classen, "Jamming the RIAS: Technical Measures against Western Broadcasting in East Germany," in *Airy Curtains in the European Ether: Broadcasting and the Cold War*, eds. Alexander Badenoch, Andreas Fickers, and Christian Henrich-Franke (Baden-Baden: Nomos, 2013), 321–46, here 323. Classen uses the notion of "war in the airwaves," but he also refers to the German original, "Krieg im Äther," which translates as "war in the ether."

16 Friedrich Kittler, "Unconditional Surrender," in *The Truth of the Technological World*, ed. Hans Ulrich Gumbrecht (Stanford, CA: Stanford University Press, 2013), 195–208, here 203.

tower, only a few meters shorter than the Empire State Building—and it enabled the Third Reich to broadcast across most of the European territory. 12/fig.3

On March 19, 1945, Adolf Hitler issued his so-called "Nero Decree" (*Nerobefehl*), an order declaring the mandatory destruction of "all military transportation, communications, industrial, and supply facilities within the Reich that the enemy might in any way use, immediately or in foreseeable time, to continue fighting." 13 However, in May of the same year, Soviet occupation troops made two important moves in German territory. The first was to occupy the Haus des Rundfunks, then located in the British-occupied sector. The second was to dismantle the Deutschlandsender III. The broadcasting house designed by Poelzig therefore survived the Nero Decree. The transmission tower was removed, defying the explicit prohibition signed by the Allies, specifying that "No ship, vessel, or aircraft is to be scuttled, or any damage done to their hull, machinery or equipment, and also to machines of all kinds, armament, apparatus, and all the technical means of prosecution of war in general." 14 Both transgressive acts were as symbolically important as they were technically relevant, and served as the prolegomenon to what has been called "war in the ether" between the Eastern and Western blocs. 15 This notion refers to the conflicted media exchange across the Iron Curtain that took place during the Cold War years. It is exemplified by the BBC's *East Zone Programme* targeting Eastern Germany; by Radio Free Europe broadcasting "objective" news and entertainment from Munich; by Rundfunk im amerikanischen Sektor's (RIAS) *Aus der Zone für die Zone* (From the zone, for the zone) program broadcast from West to East Berlin; and the GDR's Berliner Rundfunk and Radio Berlin International, broadcasting music, news, and political propaganda in ten languages from Berlin throughout the world.

The idea of ethereal war—central for the understanding of the dynamics of the so-called "postwar" in Germany—mostly alludes to the remote exchange of information and entertainment across the Iron Curtain. But what is at stake here is how that apparently immaterial exchange was physically and materially constructed. At its core was a process that Friedrich Kittler defines as "technology transfer." 16 By this notion, the German media scholar refers to the process of conservation and appropriation of German-designed electronic media-technologies during the Second World War and their latter adaptation into the mainstream





media industry after the end of the armed conflict. By scaling up Kittler's notion to the size of buildings, one can see how both the Western Allies and the Soviets realized early on the relevance of the *architecture of radio*. Within the process of technology transfer, not only tape recorders, mixing boards, and radio ampli-



fiers were preserved, but also whole building typologies, such as the broadcasting house and the transmission tower. Thus, buildings were transferred and protected as one among many other media artifacts, halfway between a technological

**fig. 4** RIAS's Broadcasting House portrayed on a postcard. The postcard was sent to local and international audiences requesting feedback about signal reception of RIAS's short-, mid-, and long-wave transmissions.

gadget and a piece of infrastructure. The bricks (as material), the walls (as elements), and the floor plans (as *dispositifs*) were passed from one system to the other. <sup>17</sup>

The first frictions between blocs were made evident precisely by the two sides' attempts to gain access to the seemingly invisible and immaterial technology of radio by taking control of specific – and highly material – artifacts on the ground. On the one side, already in 1945 – and just a few days after having occupied the Haus des Rundfunks – the Soviets took control of Sender Tegel, a transmission tower located in the French-occupied sector. Once in control of Poelzig's building, the tower, and a group of former Nazi radio technicians, the Soviets began their own radio transmissions. On the other side, the Americans were slower to understand the relationship between architecture and the ethereal medium. Access to Soviet facilities was denied to them in 1945, a first sign of hostility from the East toward the West. Therefore, the Americans had to rely on an older standard: wire. <sup>18</sup> In 1946, they occupied the Fernmeldeamt (telephone exchange building), designed by Berlin architects Otto Spalding and Kurt Kuhlowl in 1929. Besides the stylistic similitude with Poelzig's design – visible in the so-called *Backsteinexpressionismus* (brick expressionism) – the most important characteristic of the Fernmeldeamt was that it was directly wired to most Berlin houses through telephone lines. When the Drahtfunk im amerikanischen Sektor (DIAS) began its broadcasting activities in 1945, it did so via telephone, utilizing the old *Drahtfunk* technology – wired broadcasting – and reaching only 1 percent of the Berlin audience. <sup>19</sup> Through wires, instead of electromagnetic waves, the Americans temporarily sought to create an alternative *architecture of radio*. In 1948, after transforming the walls of the former I.G. Farben

<sup>17</sup> The tape recorder – the gadget that transformed the music industry in postwar Britain and the United States – was a technology developed by German engineers during the Second World War. See John T. Mullin, "Creating the Craft of Tape Recording," *High Fidelity Magazine* 26, no. 4 (1976): 62–67; Peter Hammar and Don Ososke, "The Birth of the German Magnetophon Tape Recorder 1928–1945," *db Magazine* 16, no. 3 (1982): 47–52.

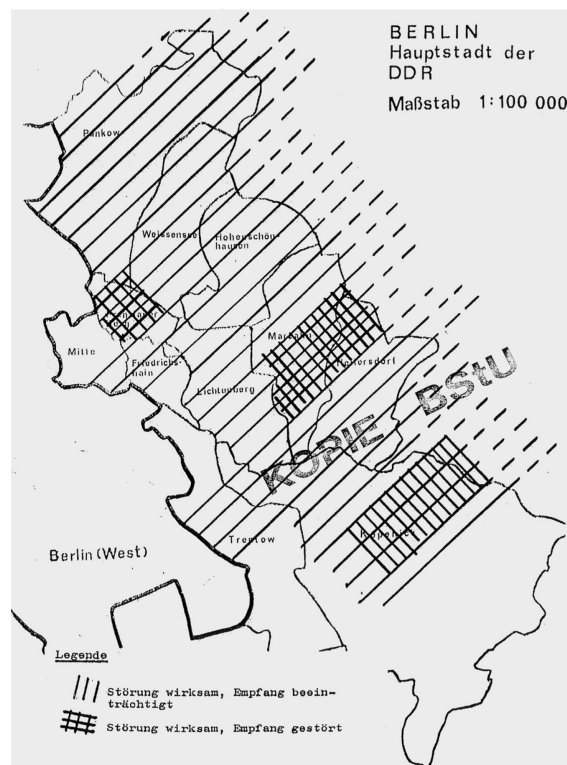
<sup>18</sup> Architekten- und Ingenieur-Verein zu Berlin, ed., *Berlin und seine Bauten*, pt. 10, vol. B: *Anlagen und Bauten für den Verkehr* (4): *Post und Fernmeldewesen* (Berlin: Ernst & Sohn, 1987), 137.

<sup>19</sup> Nicholas J. Schlosser, "The Berlin Radio War: Broadcasting in Cold War Berlin and the Shaping of Political Culture in Divided Germany, 1945–1961" (PhD diss., University of Maryland, 2008), 98.

**fig. 5** Map of radio jamming in East Berlin.

(Interessengemeinschaft Farben-industrie AG) industrial building into its first official broadcasting house **fig. 4** —and wiring it to an improvised transmission tower located in Britz—DIAS, now able to broadcast using radio waves, finally became RIAS. By the time of the official division of Berlin in 1949, however, RIAS was the most popular radio station in both East and West Berlin, being centrally directed and highly prescribed by the American federal government through the Allied High Commission for Germany. <sup>20</sup>

<sup>20</sup> Ibid., 19.



**2** The manipulative power of “capitalist” media seemed almost impossible to subdue only through propagandistic political speech, and the GDR lost significant influence on both sides of the Wall. <sup>21</sup> This, together with the escalation of the political conflict—which forced the GDR’s Berliner Rundfunk to leave its walled enclosure at Poelzig’s Haus des Rundfunks in the British sector—motivated a radical reaction to the East’s *architecture of radio*. In 1952, the GDR decided to centralize all of its broadcasting stations, creating the Staatliches Rundfunkkomitee (State Radio Committee) in an effort to overcome East Germany’s secondary position in the ethereal war. This process of centralization triggered two significant operations. The first was an anti-RIAS media campaign, <sup>22</sup> and the second was a redesign of all media content produced by the GDR’s broadcast institutions. Both strategies were widely carried out through architecture; in particular, through a sophisticated understanding of the agency of walls.

At a territorial scale, the most important and aggressive movement was the jamming of undesirable “capitalist frequencies” emitted by RIAS in the West. With great secrecy, the GDR began to grid Berlin with an array of lightweight movable transmitters. <sup>23</sup> A map developed by the Stasi (the GDR’s Ministry of State Security) shows the impact of these transmitters, together with the transformation of what a wall might be under the logics of radio. **fig. 5** The zones demarcated by single diagonal lines show the areas of partial jamming. Where those lines are intersected by perpendicular ones, the jamming was effective

<sup>21</sup> See Nicholas J. Schlosser, “Creating an ‘Atmosphere of Objectivity’: Radio in the American Sector, Objectivity and the United States’ Propaganda Campaign against the German Democratic Republic, 1945–1961,” *German History* 29, no. 4 (2011): 610–27. See also Don R. Browne, “RIAS Berlin: A Case Study of a Cold War Broadcast Operation,” *Journal of Broadcasting* 10, no. 2 (1966): 119–35.

<sup>22</sup> See Nicholas J. Schlosser, *Cold War on the Airwaves: The Radio Propaganda War against East Germany* (Urbana: University of Illinois Press, 2015), 108.

<sup>23</sup> Classen, “Jamming the RIAS” (see note 15).



(i.e., total). By 1957 the GDR had built over three hundred jamming transmitters, which performed as virtual walls protecting ethereal sovereignty.<sup>24</sup> These “radio-activities” transformed Berlin’s urbanism into an ocean of invisible, overlapping concentric and radiating circles rather than two sectors divided by clearly defined lines. They illustrate the fact that media creates space, that there is no perfectly negative wall under the logics of radio, and that “information, as such, may be morally neutral but it is certainly not inactive,” even at an urban scale.<sup>25</sup> The strategic location of buildings loaded with radio-emitting and radio-receiving capacities turned Berlin into a synthetic geography, a manufactured terrain in which the traditional urban elements of streets, blocks, and squares coexisted with the overlapped agency of different kinds of walls fighting to turn noises into signals and signals into noise. Even before the construction of the concrete Berlin Wall, this material fabrication of noises and signals twisted and expanded the dialectic conceptualization of the wall in terms of retreat and exclusion from information. As shown on the map, the boroughs of Prenzlauer Berg, Marzahn, and Köpenick were circumscribed and walled by noises interfering with signals emit-

<sup>24</sup> Schlosser, *Cold War on the Airwaves* (see note 22), 127.

<sup>25</sup> Evans, “Rights of Retreat” (see note 1), 335.



**fig. 6** Funkhaus Berlin-Nalepastraße seen from across the Spree River.

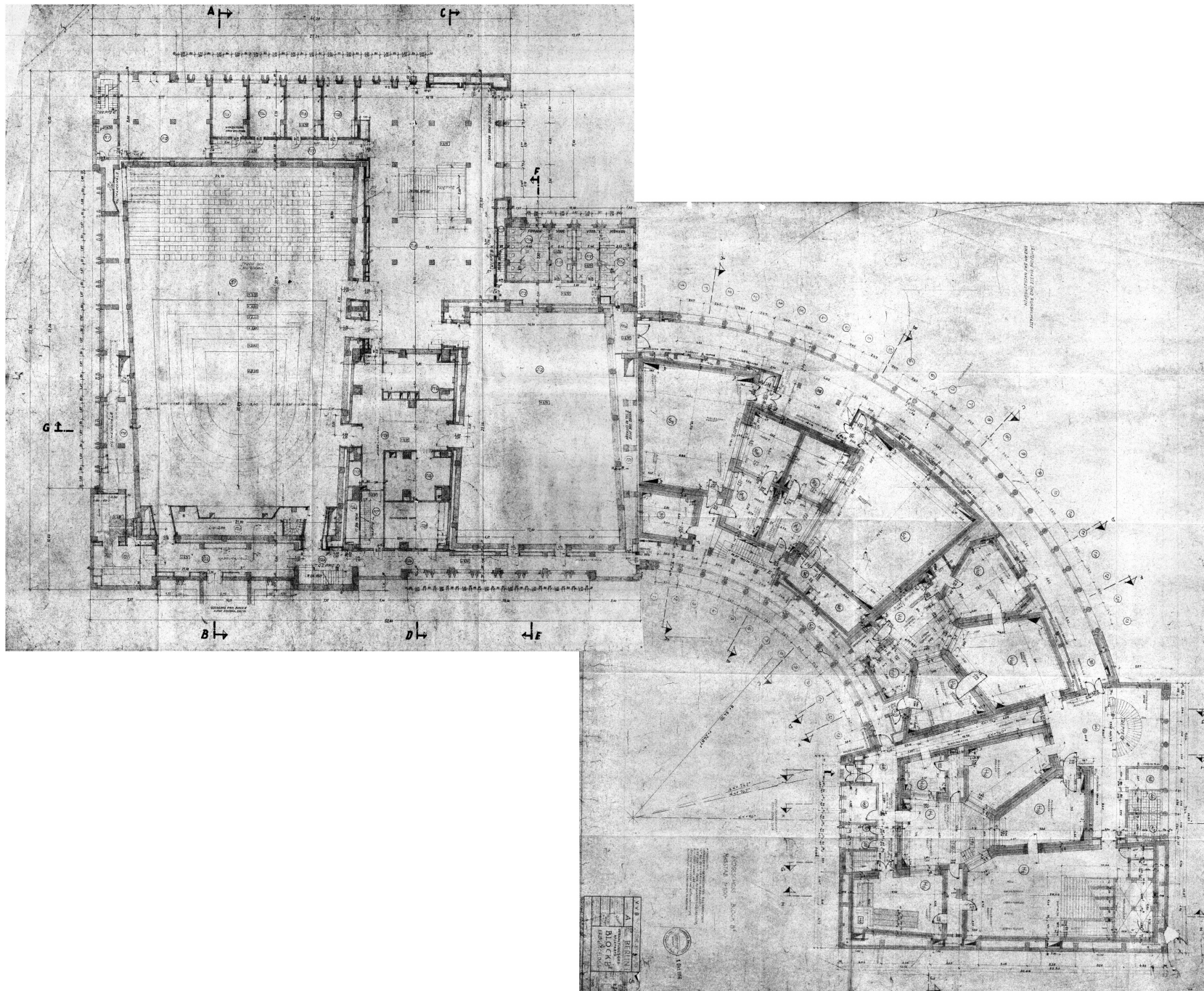
ted from the secluded and walled West. Instead of clearly defined retreats and exclusions, the environment is structured by nesting, temporally defined, and simultaneous thresholds.<sup>26</sup>

At another scale in this environmental war for and against information, the establishment of the Staatliches Rundfunkkomitee had a significant impact on the creation and dissolution of radio stations and institutions within the GDR. Following a complex process of bureaucratic transformation, a range of media-institutional

<sup>26</sup> Accepting a degree of generalization in the city structure of Berlin, Prenzlauer Berg was a residential district with a fluctuating population but relevant for the GDR for its proximity to the newly planned center of Alexanderplatz. Marzahn was a district that concentrated massive *Plattenbau* or prefabricated housing complexes for the working class. Köpenick was an industrial area in which, probably not coincidentally, the GDR’s “media industries” for radio and television were located.



fig.7 Block B Floor  
plan Funkhaus  
Berlin-Nalepastraße.





reorganizations was materialized in one particular building. In the crucial year of 1952, the architect Franz Ehrlich was commissioned to design the new headquarters for radio in the GDR, the Funkhaus Berlin-Nalepastraße. Completed in 1956, it was the most complex iteration in the concretization of the typology of the broadcasting house. The Funkhaus, executed in the context of the ethereal Cold War, was clearly designed and shaped by the internal forces of the GDR's broadcasting program and the external political forces of the time. fig. 6

Ehrlich studied at the Bauhaus from 1927 to 1930 and was a student of Moholy-Nagy, who at the time was working on the Funkturm photographs. This was also when Oskar Schlemmer was aiming to "dissolve the subject" into circular radiating patterns, as expressed in the design of the costumes for his performances. <sup>27</sup> Simultaneously, Siegfried Ebeling was thinking space, through its relation to electromagnetic radiation, as a membrane. <sup>28</sup> While a student, Ehrlich worked with Walter Gropius in the Totaltheater project for Erwin Piscator <sup>29</sup> and also as an intern in Poelzig's office at the time Poelzig was working on the Haus des Rundfunks. <sup>30</sup> Spanning a period from the Weimar era to Cold War Germany—including time as a Nazi prisoner, during which he was forced to work on the design of concentration camps—Ehrlich's career embodies both the shift and transformations of the broadcasting house typology and the impact of radio onto how space was thought, created, and perceived. <sup>31</sup> It is not by chance that the Funkhaus Nalepastraße shares certain morphological and stylistic characteristics with Poelzig's building. In the Funkhaus, one can still perceive echoes of *Backsteinexpressionismus* and the long frontal facade reminds one of its western predecessor. Even the characteristic curvilinear corridor with studios attached to one side remains in Ehrlich's design, although no longer in a symmetrical order.

If at the scale of the territory the location of jamming transmitters was about the erection of a wall for turning signals into noise, at the scale of the building the aim was to build walls whose agency would create new and recognizable sonic content. The complex organization of walls in Ehrlich's design follows a precise and heterogeneous set of programmatic, geometric, and performative requirements. In the original publication of the building in the journal *Deutsche Architektur* in 1956, Ehrlich describes the Funkhaus as "one external house and eight internal houses." <sup>32/fig. 7</sup> Indeed, the structure is based on a house-within-a-house scheme, with the "exterior house" built out of load-bearing concrete walls partially clad with brick. Its relatively superficial foundations leave the program above the level of the ground,

<sup>27</sup> See Noam M. Elcott, *Artificial Darkness: An Obscure History of Modern Art and Media* (Chicago: Chicago University Press, 2016), 175–82.

<sup>28</sup> Siegfried Ebeling, *Der Raum als Membran* (Dessau: C. Dünhaupt Verlag, 1926).

<sup>29</sup> Franz Ehrlich, "Bauhaus und Totaltheater," *Wissenschaftliche Zeitschrift der Hochschule für Architektur und Bauwesen* 29, nos. 5/6 (1983): 424.

<sup>30</sup> Bernhard Kohlenbach, "Franz Ehrlich — Ein Architekt zwischen Bauhaustradition und DDR-Baudoktrin," *ICOMOS — Hefte des Deutschen Nationalkomitees* 20, (2015): 44–47, here 45.

<sup>31</sup> According to the available sources, Ehrlich's role in designing concentration camps mainly involved interior and fence design. See Volkhard Knigge et al., eds., *Franz Ehrlich: Ein Bauhäusler in Widerstand und Konzentrationslager* (Weimar: Stiftung Gedenkstätten Buchenwald und Mittelbau-Dora, 2009). See also Michael H. Kater, *Weimar: From Enlightenment to the Present* (New Haven: Yale University Press, 2014), 247.

<sup>32</sup> Franz Ehrlich, "Aufnahme- und Studiogebäude des Staatlichen Rundfunkkomitees," *Deutsche Architektur* 9 (1956): 399–409, here 400. Translation by the author.

avoiding complexity and excessive costs in the construction (a consequence of the building's close proximity to the Spree River), and large concrete beams allow a free span from side to side. The other seven "interior houses" are structurally independent from the exterior one and are constructed using a sophisticated



ed system of multilayered double walls. Wires and technical facilities occupy the technical poche between them, allowing the interconnection of spaces not through circulation, necessarily, but through electricity at the speed of light. Notwithstanding — or precisely

**fig. 8** View of one of the control rooms in Block B.

because of — the wire-less nature of radio, everything needed to be and could be wired within the Funkhaus.

Looking from right to left at the floor plan of Block B, the part of the building complex containing the recording studios, the first "house" is a cluster comprising five rooms surrounding a six-sided *Regieraum* (control room) designed to perform and record radio plays. Each side of the control room connects with a separate room through an acoustically sealed window. The visually connected but sonically hermetic spaces collapse in the mixing board and the tape recorder installed in the control room. They literally act as *Raummaschinen* (space machines), because all the discreet sounds produced within the different rooms are routed by wire to the machines occupying the central space.<sup>33</sup> The walls defining the cluster therefore perform as material and spatial extensions of the montage-capacities of the mixing board and the tape recorder, mediating between discreet sonic signals and the electronic machines. **fig. 8**

A corridor separates this cluster from another that follows similar morphological and programmatic principles. The adjacent trapezoidal space, Saal IV, was designed to record dance music, with a reverberation time of 1.2 seconds.<sup>34</sup> The four trapezoidal rooms that constitute the fourth "house" are small, intended for the recording of solos. Each room is acoustically and visually independent from the others. The large trapezoidal room of Saal III also has a reverberation time of 1.2 seconds and was designed for the recording of chamber music. A trapezoidal shape is used for all the music recording rooms to avoid the acoustic problems of parallelism. Slight variations in angles — combined with the differing materiality of each wall — give individual

<sup>33</sup> The notion of "Raummaschine" was used by Ehrlich himself to describe his collaboration with Gropius in the Totaltheater project design for Piscator in 1927. See Ehrlich, "Bauhaus und Totaltheater" (see note 29). While in the context of the theater the notion refers to the mechanical adaptability of the stage in order to blur the boundary to the audience, and allow simultaneous performances, in the context of the Funkhaus and its electronic media apparatus it can be understood as a description of the ability to allow the simultaneous coexistence of various sonic spaces and to join the record studios with a much wider audience.

<sup>34</sup> Reverberation time, usually counted in seconds, is the duration between the emission of a sound and the decay in its intensity below the level of human perception, as it echoes in a room. For an early study on reverberation time, see Wallace C. Sabine, *Collected Papers on Acoustics* (Cambridge, Mass.: Harvard University Press, 1922).



35 Ehrlich, "Aufnahme- und Studiogebäude" (see note 32), 402. Translation by the author.

36 Klaus Wagner and Wolfgang Hoeg, *Stereofonie-Aufnahmeftechnik* (Berlin: VEB Technik, 1970), 80–6. See also Alexander Raschkowitsch, "Neue Musik- und Hörspielstudios," *Radio und Fernsehen* 5 (1955): 204–7.

rooms unique sonic signatures. The adjacent large trapezoidal room, Saal II, was designed for small orchestras, with a reverberation time of 1.4 seconds. Saal I, or the Grosser Sendesaal (reverberation time: 1.8 seconds), is located at one extreme of the complex spatial distribution and can fit an entire symphony orchestra. It is the largest recording studio in the world. Finally, two control rooms—one facing Saal II, the other facing Saal I—separate and mediate both major rooms within the building. However, what is most relevant in Saal I is the absence of an audience. In previous iterations of the broadcasting house typology, plan and program were basically structured around a normal concert hall, with a stage and an audience in front. The Funkhaus, in contrast, contains a highly refined concert hall with practically no place for a physically present human audience. Musicians are "like in a tub ... floating in space,"<sup>35</sup> and newly engineered Neumann CMV 551 condenser microphones—floating in space, too, according to a precise placement designed by the engineer Klaus Wagner—replace the listeners.<sup>36/fig.9</sup>

Looking at the whole complex of the Funkhaus, one can trace the path that sound—the raw material—follows within the building as it is transformed from the realm of mechanics into media content broadcast through electromagnetic waves, almost as in a "production line": From a bus terminal in Block D covered by twelve concrete half vaults, receiving daily over five thousand employees; to the recording rooms in Block B, where a wide, massive staircase is finished in raw concrete, carpet, and wood (leading nowhere, its sole purpose being to serve as a resonating device for recording footsteps under different acoustic conditions);<sup>fig.10</sup> or to the studio next door, where all the flooring is exchangeable, giving access to a wide set of materials to, again, mimic or craft sounds; then to the Grosser Sendesaal, where the sound waves bounce off the geometric patterns of the internal surfaces of the room before reaching the newly engineered Neumann microphones, which are capable of perceiving those waves with great precision; or through wires to the control and listening rooms where the tape machines are located, followed by the mixing board and mastering studios; and finally to the transmission station, an entirely different typology operating with large diesel engines, heavy machinery, and a 250-meter-tall tower, which transforms electric impulses into radio-electromagnetic waves, delivering them to domestic radio receivers and speakers, and through those to the ears of the inhabitants of East and West Germany and, in some cases, even to the entire planet.



The drawing consists of two parts. The left part is a perspective view of a concert hall stage and orchestra pit area. It shows the 'Schlagwerk' (organ) on the left, the 'Windenanlage mit Raummikrofon R' (wind machine with room microphone) at the top center, and the 'abgesetzte Raummikrofone' (separate room microphones) on the right. Dimensions include a total width of 88.5m, a depth of 10m, and a distance of 13m from the organ to the microphones. The 'Spielhöhe der Instrumente' (instrument playing height) is 2m, and the 'Höhe der Direktmikrofone' (height of direct microphones) is 3m. The 'Mikrofonentfernung für Streicher' (microphone distance for strings) is 2m. The right part is a detailed top-down view of the stage area, showing the 'Schlagwerk', 'Traverse', 'Passeuse', '2 Kl.' (2nd clarinet), '2 Fl.' (2nd flute), '4 Hörner' (4 horns), '2 Violinen' (2 violins), 'Bratschen' (violas), 'Celli' (cellos), and 'Bässe' (basses). Dimensions for the stage area include 2m, 3m, and 3.5m. Below the stage area is a table of microphone heights for different instruments.

Mikrofonhöhe für	1, 2, 3, 4, 5	ca 3m
Mikrofonhöhe für	6	ca 2m
Mikrofonhöhe für	7, 8	ca 13m
Mikrofonhöhe für	9, 10, 11	ca 5m

**37** Evans, "Rights of Retreat" (see note 1), 335.

The architecture of the Funkhaus helps us to reframe the question of the wall within the “environmental history of the war against information.”<sup>37</sup> The Funkhaus contains different types of walls, and they perform at various levels. On the one hand, they divide, they create heterogeneity through fragmentation, and they allow the simultaneous coexistence of adjacent singularities through a calibrated balancing of hermetic seals and permeability. On the other hand, the inner surfaces of the walls are constantly vibrating; they reflect and then radiate every sonic impulse that has been emitted, being the very medium that blends sonic and spatial qualities into electric signals. This twofold performance of the walls within the Funkhaus is achieved through their geometric disposition and material constitution. They mechanically perform a function equivalent to the one attributed to the Subharchord synthesizer utilized by Rzewski for his piece “Zoologischer Garten”: to fabricate sounds that do not exist otherwise. One using a mechanical and the other an electric sonic impulse, both “machines” inscribe spatial qualities to sounds, or what acousticians refer

38 Lothar Kiebs, "Perspektiven für eine raumbezogene Rundfunkübertragung," *Technische Mitteilungen aus dem BRF 1* (March 1960): 2–20.

39 Gerhard Steinke and Dieter Boeck, "Die Musikwerkstatt," radio program, recorded at the Funkhaus in Saal III, November 6, 1964, in AdK, AVM-31 0801.1-2. Translation by the author.

fig. 10 Staircase in Block B finished in carpet, wood, and concrete.

to as *Raumeindruck* (spatial impression) — usually understood as the spatial sensation in sound but combining the separate words *Raum* (space) and *Druck* (pressure) and also carrying the meaning of imprinting space into sounds. 38

In 1964, sound engineer Gerhard Steinke explained the technical and aesthetic capacities of the recently completed Funkhaus during the radio program "Die Musikwerkstatt." When asked about the main potential of his research in the Labor für akustisch-musikalische Grenzprobleme, he was clear: "what we want to do is to broadcast the space. And it is not that you will be in the concert room, but you will feel, that behind that wall, that loudspeaker-wall, there is the room." 39 Through its walls the Funkhaus created spaces to be recorded and transmitted across Berlin, defining the very spatiality of the city by entering and perforating the domestic and working areas of its inhabitants. The Funkhaus thus appears as a material manifestation of the apparently immaterial transgression that radio waves performed in and across Berlin. By analyzing this transgression, we can begin to understand not only the important role that architects played in the design of those constructions but also the nature

of an *architecture of radio*; that is, radio itself as architecture. This architecture is understood as a system of relations, a tectonic arrangement woven across different institutions, scales, and technologies. Conceiving architecture in this way implies looking at elements such as windows, doors, walls, and columns in relation to electronic media devices such as tape recorders, mixing boards, vacuum tubes, transistors, and microphones; analyzing the internal organization of building types and how they relate to these elements; and understanding their disposition and location within the structure of the city. The *architecture of radio* is not a top-down project designed by any specific architect, planner, or political agent alone. Rather, it is a technological ensemble constructed by electronic and mechanical elements, building types, and ultimately by urban structures making indissoluble the relationship between these three scales of operation.



The political agency of this form of architecture depends on how it transgresses, redefines, and redistributes limits and thresholds that have been traditionally understood as stable and solid. Rather than being an obedient and monumental form of construction — onto which stable political constructs are applied — the *architecture of radio* is a medium through which questions of power and ideology must be defined and redefined, negotiated, and calibrated. It redistributes and destabilizes the order of the *polis* and thus has political power, but one that neither East nor West fully controlled or could fully align with. Architecture, to be sure, is always political, but the politics of architecture do not necessarily coincide with the politics of those who conceive it. In the argument constructed here, the walls of Berlin once operated as both: as the sensors upon which the *architecture of radio* left its traces, and as the very agents through which this form of architecture effectively performed. Thus, Berlin and its walls seem to be the perfect ruin from which to understand and learn how to “deal with a strange” — and intrinsically architectural — “way in which human beings render their world inhabitable by circumscribing and forgetting about those parts of it that offend them.” 40

40 Evans, “Rights of Retreat” (see note 1), 335.