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# Where's Leo?

*Jack Burnett-Stuart*

The Berlin architect Ludwig Leo has been described by the critic and theorist Dieter Hoffmann-Axthelm as ‘the single German architecture-myth of postwar architecture’.<sup>1</sup> But what exactly is an ‘architecture-myth’, and what is it about Leo or his work that makes such a claim plausible? Perhaps it has something to do with the apparent contradiction between the widely acknowledged power of Leo’s small architectural *œuvre* and the remarkable lack of published information about either him or his work. Leo is uncharted territory, about whom more or less fantastic stories are told. One of these is that he was the great architect who chose not to compromise and as a result built very little. All of this, though, begs the question as to precisely what ideas Leo is seen to embody and the position of his work within contemporary architecture or, even, where actually is Leo?

Although there is undoubtedly an appetite to know more about him, Leo has chosen not to enter into the usual relationship between acclaimed architect and the architectural media. His two most celebrated buildings, the circulation tank for ship building research (or Umlauftank) and the lifeguard headquarters (or DLRG), were both built in Berlin by the mid 1970s. Across the 30-year interval since their completion, encompassing the end of the GDR and Berlin’s special place in postwar Germany, the buildings now seem somewhat like constructivist projects from 1920s Moscow, abruptly abandoned experiments from a bygone era. The unexplained end to Leo’s career as a building architect when he was only 50, shortly after the completion of these two projects, has lent him an air of mystery, which Leo himself, still living in Berlin, does little to dispel. But the bare facts of his career can be stated as follows: born in 1924; studied at Berlin’s art school, the HDK, 1948–54; worked briefly for Hans and Wassili Luckhardt and O M Ungers before establishing his own practice in 1956, working with one or two assistants out of his Charlottenburg apartment office, realised six main projects in Berlin between 1958 and 1976 (day-care centre, Loschschmidstraße, 1958–59; student accommodation, Eichkamp, 1959 (with Georg Heinrichs and H C Müller); sports hall, Charlottenburg, 1960–65; housing and post-office, Märkisches Viertel, 1967–70; Umlauftank, 1967–75; DLRG-Zentrale, 1967–73); numerous other prize-winning, but unrealised competition designs and projects; professor at the HDK, 1975–82; most recent known work: the 1993 unbuilt design for the Akademie der Künste on Pariser Platz, Berlin.

This paucity of hard information provides fertile ground for myth-making, to the extent that everyone of a certain age in the Berlin scene seems to have an apocryphal story about Leo or to be his former student. Like many British admirers of Leo, I was first introduced to his work at a talk given by Peter Cook at the AA in the mid-1980s – the Umlauftank and DLRG appeared to have a permanent presence in Cook’s slide carousel. As far as I can remember, Leo’s early work was said to be dull, and the transformation marked by the Umlauftank and DLRG was seen to reflect the influence of Archigram – hence, perhaps, Cook’s interest as progenitor. For the record, Leo says he had no interest in the work of Archigram.<sup>2</sup> No one, however, knew much about him – Leo didn’t like to talk. And he also didn’t want to do one of the Berlin IBA projects that everyone was so excited about at the time. It all sounded rather mysterious.

A few years later when I found myself living in Berlin I was fortunate enough to actually meet the man himself. Obviously, though, one does not just call up Leo and ask for a chat. Using Dieter Hoffmann-Axthelm as our intermediary, a number of German colleagues and I asked if we could discuss with him the design of a

housing project we were then working on. Leo, we were told, was prepared to see us, and it was arranged that we should all meet on neutral territory at a cafe called Die Schwarze Pumpe, which seemed like a suitably named place for a rendezvous with the designer of the Umlauftank. Given Leo’s reputation, we were full of trepidation, but he turned up at the agreed time, full of vitality, his intense gaze magnified through his large spectacles. The meeting went on for several hours. He asked to see 1:50 plans and then imagined elaborate, extremely vivid scenarios for how spaces could be used – for example, if a doctor came to visit a patient in this housing block, where would he hang his coat, put down his instruments, wash his hands? The project brief was seeking to maximise the flexibility of a loft building type. Picking up on this flexibility, Leo suggested that we put the drains on the facade of the building so that they could be moved around. The image he had in mind was of the drainpipes on the back of terraced houses in England. This, he recalled, had been one of his first impressions of England, seen from the train when he came to London as a student in the early 1950s to work for YRM (now who knew about that?). He also talked a good deal about the *Wrasenrohr* – a kitchen ventilation duct integrated into the chimney system of the traditional Berliner *Mietshaus* (‘always gets papered over’) – and about the *Kaminmeister’s* (or chimney inspector’s) valuable knowledge of the workings of a *Mietshaus*. Leo led the conversation all over the place and at a great pace. Even my German colleagues admitted to difficulty in keeping up with him. Much of it was about the people he had worked with or chance encounters, sometimes outlandish, that had been important to him.

It was clear from this meeting and the others that followed that observation and experience were very important to Leo’s own work, and that he was able to translate them with unusual fluency into architectural ideas. Indeed, in conversation he showed little interest in historical works of architecture as received knowledge – for example, when we talked about Moscow, trying to draw him into a discussion about the constructivist buildings that seemed relevant to his work, he wanted only to talk about shared *kommunalka* apartments in old tenement buildings. With Leo, then, the ability to understand and contextualise his work appears to depend, not as much on abstract philosophical or historical questions, as on finding out more about his life – how, for instance, did he become so interested in the *kommunalka* in the first place? At these meetings it also became clear that, contrary perhaps to the general impression of his reclusiveness, he did not operate in isolation. Leo was a ceaseless talker, storyteller and persuader – someone very much engaged with the world on his own terms. Communication – by telephone, fax but above all around a table – was central to his life and by extension to his architecture. He exuded great energy, which seems like the only way any of his extraordinary buildings could actually have been built.

In contrast to their enigmatic architect, Leo’s buildings are there for everyone to see. It is possible to visit many of them, but more importantly they are part of the experience of the city. No one in Berlin can fail to spot the Umlauftank. Not only is it sited at the crossing-point of three major arteries in the city – the S-Bahn, the east-west axis and the canal – but the building itself is also very big, much taller than the surrounding trees of the Tiergarten, and painted in bright pink and blue. Despite this, the Umlauftank never features on postcards – unlike, say, the Philharmonie, national gallery or even the holocaust memorial. It is not recognised by the public as architecture, but seems more like a piece of industrial equipment that has

crash-landed in the wrong place, its only nod to contextualism being its pink and blue, which mysteriously match the colours of the pipes running above the streets in other parts of the city while the underground infrastructure is being renewed. Recently a huge model of Berlin was built by the city's planners to inform the public about the panoply of new projects underway. Every existing building was accurately represented, with important historical buildings detailed down to their Corinthian capitals, but the Umlauftank, for all its size, simply appeared as a rectangular block. For the makers of the model it was not architecture either. Through all of this, and in spite of their undeniable physical presence, Leo's buildings could be said to have disappeared from general view. To paraphrase Walter Benjamin, they are received in a state of distraction rather than attention.

Among the architectural community, by contrast, the situation is rather different. Leo's work may not be widely familiar outside Berlin, but his reputation among those in the know is unassailable. Despite this, the absence of any literature indicates a difficulty that cannot be simply explained by Leo's own reticence – his work seems to resist easy interpretation or labelling as effectively as he himself avoids the limelight. Although claimed by the avant-garde as one of their own, he has nonetheless been highly praised by both Léon Krier and Dieter Hoffmann-Axthelm.<sup>3</sup> Since his work does not seem to fit into any established narrative, there is a temptation to see it as eccentric (the inclusion of the Umlauftank in Charles Jencks' *Bizarre Architecture* is just one notable example of this).<sup>4</sup> This situation, however, is now slowly changing, at least in Germany. For example, the architectural historian Gregor Harbusch has convincingly filled in the historical background on Leo's way of working, tracing the influence of Hannes Meyer, Leberecht Migge, Alexander Klein and other architects of the 1920s, as well as conducting a series of interviews with Leo and his various associates, providing new biographical details.<sup>5</sup> This work, alongside an important essay by Hoffmann-Axthelm, who analysed Leo's last published work – the 1993 design for the rebuilding of the Akademie der Künste in Pariser Platz – can be seen as important opening moves in an overdue reassessment of Leo and his architecture.<sup>6</sup> They also show the enormous range of enquiry that can be productively applied to his work – and the field is still wide open.

My own approach, as an architect rather than a historian, has been built on the experience of visiting and observing the buildings in use – an essential corrective to the impression gained from the few published photographs of Leo's buildings that do exist, such as those by Gerhard Ullmann, which seem to take particular care to exclude all signs of human existence.<sup>7</sup> Ullmann's black-and-white photography, with its frontal composition and slight air of abandonment, brings to mind the work of Bernd and Hilla Becher – an interesting connection, for there does indeed seem to be an affinity between Leo's work and the anonymous industrial building-types photographed by the Bechers, but this also obscures the full scope of Leo's architectural concerns. Perhaps this is also Leo's intention: the overt functionality of the work sometimes seems to be a means to deflect attention away from the architecture and the architect. Photographs also tend to give a distorted impression of Leo's work, overemphasising their external form at the expense of conveying a sense of their complex internal structure. Indeed, the internal spaces of a Leo building sometimes feel more like the cramped insides of a ship than anything previously associated with architecture. This makes them difficult to photograph. Since architectural

culture is largely disseminated through photographs, this has also, no doubt, contributed to the problem of assessing Leo's work. One really needs to get inside the buildings and experience them in use. While the vaulted space of the sports hall, for example, photographs well, the full drama of the space is only experienced as a spectator, by coming to it through the dark, low-ceilinged foyer, and looking down into the loud and brightly lit playing area through the concrete ribs of the roof structure. The spatial drama is even more extreme for the athletes, with their low gangway and changing rooms tucked under the tribune. The 2m-high headroom in the gangway proved too low, however, for the taller generation of professional basketball players who turned out for Alba Berlin in the 1990s, and so even Leo's own commitment to flexibility appeared to fail from time to time.

The other, obvious, way of approaching Leo's work is through his drawings, although as with everything else these have not been extensively published and the initial impression of those that have appeared is underwhelming – Leo's presentation material is typically unembellished, and consists of blueprinted plans, sections, a facade, a list of floor areas, a short text and no models or perspective views. His set of drawings for the Akademie der Künste project, for example, show a rather quiet building that deals scrupulously with the historical remnants of its Berlin site – at first glance a surprising about-turn for the architect of the Umlauftank. Looked at more closely, however, they reveal the full scope of his endeavour. Each project needs to be seen as the tangible condensation of a wide-ranging process of observation and research, embracing, alongside his obvious interest in use, issues such as place, history, environment and technology. This makes the work highly contextual, although the context is not so much an existing condition as a field of reference that has been constructed by Leo himself.

Leo's drawings have become much more accessible since he transferred his archive to the Akademie der Künste in 2008. They can now be fully appreciated as the work of a masterful draughtsman, representing perhaps a high-point in the use of plan and section as the basis of architectural enquiry. What is unusual about them is the almost total avoidance of other types of drawing or physical models – very occasionally he does use isometric drawings to communicate details to fabricators, but the design process, from sketches to final drawings, is dominated by the task of overlaying and redrawing plans and sections on tracing paper. Since the drawings are largely by Leo himself, there is also not the usual dichotomy between design and construction drawings. Although the language of the final drawings seems strictly factual, a lot of extra information is slipped into them, partly through the distinctive drafting style – a kind of shorthand – and partly through the fact of their single authorship, which allows for a seamless flow of information from sketch to construction details. This is extremely revealing of Leo's intentions.

One such distinctive trait of Leo's drafting style is the inclusion of accurately drawn figures in plan and section. This was already fully developed in the drawings of his student housing project at Berlin-Eichkamp in the late 1950s. Leo shares credit for this project with Hans Christian Müller and Georg Heinrichs; the figures, however, are clearly drawn in Leo's own hand and occupy – fill might be a more appropriate word – the plans of the Eichkamp rooms. Leo attributes as much weight and significance to his figures as his architecture, in contrast to the generic Parker-Morris human figure, established as an architectural standard in the 1960s very much as an afterthought, a mere device to animate the space of a drawing. This unusual

relationship is partly a question of scale: the figures seem large because the rooms are indeed very small. But the figures here are much more than indicators of occupancy and use: they have become the real subject of the drawing.

When one analyses this a little further, the first point to make about these drawings – a point so obvious it is easily overlooked – is that it is actually quite difficult to draw convincing figures in plan. Leo's figures, though, are unusually lifelike – not blobs like others in plan but clearly discernible, and not emblems, as Robin Evans has described the architectural figure, but believable silhouettes who sit, eat, read and talk.<sup>8</sup> It is worth contrasting this with the Modulor-based figures that populate later drawings by Le Corbusier. In a drawing for the unfinished Venice Hospital project, for example, a single rubber-stamped Modulor man is economically used for plan, elevation and section, so that the space is shown to fit the Modulor ideal rather than articulate a realistic scenario of how a patient might use a hospital room. Far from suggesting the life of healing and recovery that one would hope to find in a hospital, the figure on Le Corbusier's bed bears an unfortunate resemblance to a corpse.

Leo's figures are also not simply reserved for presentation drawings: outlines of imagined occupants and users frequently appear in sketches, design drawings and construction drawings, as if Leo were constantly reminding himself that architecture is for people to use, and needs to fit the human body precisely. Accordingly, the experience of a Leo building is a feeling of a close and intentional fit. One biographical detail about Leo seems relevant here: he has a prosthesis, having lost a leg when wounded as a soldier in the Second World War. However well an artificial limb works, it is hard to imagine that it does not lead to a changed perception of the relationship between the body and its immediate surroundings, and a heightened awareness of posture, comfort and convenience that might pass unnoticed by the able-bodied. You can see the consequences of this in the outline figures Leo drew for the handrail drawings on his sports hall terrace; plans and sections show that he was thinking of how people would lean on the rail while waiting and looking out for friends on the street below. The handrail on the ramp curves up to elbow height as it reaches the terrace, and the concrete wall is terminated to provide greater transparency to the street. The lower rail acts as a footrest, but can also be used by children as a seat. The exaggerated diameter of the handrail, more comfortable than a standard rail, invites these varied uses and in the process elaborates the social potential of a building element that is otherwise just a safety feature.

The other point to be made about Leo's drawings is that the figures populating them establish a relationship with each other as much as the building that contains them, so that the drawings ultimately resonate as diagrams of social interaction as much as architectural design. In one of his plans for the Eichkamp student housing, for example, as many as five figures can be seen in plan occupying a single student room. The figures are so close to each other as to almost be touching, and convey an ease and certain relish at the experience of proximity. What, I wonder, would Robin Evans have made of all this. In his essay, 'Figures, Doors and Passages', which first highlighted the limitations of the Parker-Morris standard, he cites a 1928 photograph of Ilya Golosov's Zuev Club in Moscow and Alexander Klein's plan for 'The Functional House for Frictionless Living', also from 1928. Evans uses these references to argue that modernism, far from marking a decisive break with the Victorian repression of sensuality and physical contact, in fact amplified this

tendency, producing a drive for social atomisation and a 'terror of bodies in collision'.<sup>9</sup> What is interesting about Leo's drawings, however, is that they suggest an alternative modernist position, more sociable, distinctly sensual and perhaps (counter to Klein's paradigm) even 'frictional'. This may not sound especially attractive, as the social connotations of friction are generally negative. As a scientific term, however, friction is actually quite neutral – it is the resistance that one surface encounters when moving over another. If friction is seen as a necessary part of social intercourse, the idea of encouraging friction in architecture should really be desirable. As Leo said when we met him, 'in a narrow staircase, people need to be nice to each other'.

Mechanisation (in the sense of components moving automatically or powered at the touch of a button) is really quite rare in Leo's buildings and is used only where absolutely necessary, as with the boat lift at the DLRG, for example. Above all, the way things work is intended to be self-evident. Much more common are walls and vents that are moved by hand. For example, the main ventilation flaps in the sports hall require manual operation and the access gangway forms a prominent visual element of the interior elevation, drawing attention to how the building is operated. Architecture may be an enabling device, but rather than providing a frictionless environment, Leo's work makes it a thing of substance, requiring manipulation, a degree of effort and even cooperation. The metaphor for all of this, to borrow a reference common to modern architecture, is a nautical one. But in contrast to Le Corbusier's promotion of the ocean liner, where the user of the building is an idle passenger, promenading on the decks, serviced by the crew and driven by invisible machinery, any nautical association in Leo's work points towards the crew of a sailing ship, working closely together and keeping an eye out for any changes in the weather. Again, what we have here is an architecture that seems consequential to the greater goals of sociability and tactility.

To return to the Eichkamp drawings, and the implications of the many figures in the study-bedroom, Leo's accompanying project description notes that 'studying is also meeting'. This, rather than the solitary accommodation of the student, lies at the core of the programme and explains the prominence of the figures in the drawing. No longer a place of retreat, the study has become a meeting place. To understand this change, it is necessary to know something of the history of the 'student village' at Eichkamp. Indeed, to describe the project as student housing invites something of a misunderstanding, for the building itself has little in common with what is typically understood by the term. Eichkamp, independent of any academic institution, was formed in 1947 by the student initiative VISTA (Vereinigung für internationale Studententarbeit). As a self-build project, VISTA was able to occupy, repair and adapt buildings of the former Mommsen Gymnasium. Leo joined VISTA in 1948 while studying at the Hochschule der Künste, and helped to renovate and convert the buildings. The aim of VISTA was to form a community of German and foreign students, who by living together could exchange and develop ideas outside of academic institutions that were still compromised by the legacy of National Socialism. The interaction of German and foreign students coincided with the interests of the Berlin authorities and the Allies, so VISTA received official support and funds from the American McCloy Foundation in 1951 to build a clubhouse designed by H C Müller, Werner Rausch and Stefan Wewerka. By 1953 it had received sufficient international

recognition to be invited to present its work at CIAM 9 in Aix-en-Provence under the heading of 'student-initiated projects'. Leo was a member of the presentation group.<sup>10</sup>

The subsequent expansion of the student housing was initiated by VISTA in 1956 in order to strengthen the original social and political ideal. One can see this in the call for competition entries, which explicitly states that the accommodation is not to be seen as a 'hotel for students'. Since Müller, Heinrichs and Leo were all members of VISTA, the Eichkamp competition was an opportunity for them to give architectural form to the social and political ideals they all shared, based on their own experience as students at Eichkamp. Part of the brief called for a double-occupancy room, to be shared by a German and a foreign student, and was itself based on an Eichkamp precedent. For Müller, Heinrichs and Leo, their own proposal further cemented this precedent by using as a model the 1948 attic conversion of the existing Eichkamp buildings. A photograph in the archives of the Akademie der Künste in Berlin shows Leo in the 'shelf-bed' of one of these double rooms; on the reverse is written (probably by his Scottish wife Sheila, whom he met at Eichkamp): 'This is a view of the shelf-bed in our rooms. At the left of the picture you see part of the steel ladder, which is fixed to the wall. Ludwig has his mattress directly on the shelf so that he has room for a small table cross-wise across the bed.'

The centrality of sociality and communication to all of Leo's work therefore seems to be not just about conviviality, but reflects a passionate belief in the political necessity for social interaction. How much this was due to his experiences living at Eichkamp, or indeed his experiences prior to that, is a matter of speculation. Leo was born in 1924, three years after Müller and two years before Heinrichs; all three architects, therefore, came of age during the war and could consider themselves fortunate to have survived. Leo's story – the little that is known of it – is particularly striking. His family was actively anti-Nazi; his mother, a communist, had been forced to flee to Switzerland in 1940. Because of his Jewish paternal grandfather, Leo had problems obtaining an Ariernachweis (the document that confirmed 'Aryan' descent), so he enlisted in 1942 in order to avoid the notice of the authorities. Serving in the artillery, he was severely wounded in Romania in 1945.<sup>11</sup> In the wake of the war, therefore, the gathering of like-minded students at Eichkamp in 1948 would have been an opportunity to rethink the basis of not just architecture, but of a society that had been systematically indoctrinated by Nazi ideology.

Although this history – both personal and national – is surely woven into Leo's distinctive social vision, his architecture is not burdened by a heavy symbolic load. Leo's buildings do not proclaim social engagement, but register his position in far more subtle ways. The pencil figure – seen reading, eating, talking or working with others – is one such clue. Another is the recurrence and significant presence in nearly all of Leo's buildings of a telephone booth. At the DLRG, for example, the telephone is to the right of the entrance, its canopy echoing the shape of the building, and a window allows light to fall onto the telephone directory. At the sports hall, the telephone is in the foyer, facing the window, again to give the caller light, but also so that the booth shields the caller from the noise in the hall, while at the post office in the Märkisches Viertel, the telephone booths project forward from the building line, forming a screen for the entrance. Given Leo's concern for communication, it is not surprising that he should consider the telephone (in a period before wireless telecommunication) as a part of the architectural problem.

No other architect, though, seems to have given the telephone booth such prominence, transforming it from a purely functional thing into a container of architectural meaning; the building as a place of communication. The technology of communication finds architectural expression in at least two other instances – the radio mast at the top of the DLRG, which was intended to communicate with a sister organisation on the Müggelsee in East Berlin, and the telephone exchange at the post office in the Märkisches Viertel, where a yellow bridge across the street becomes a landmark for the district.

To pursue this idea a step further, it could be argued that Leo's buildings not only facilitate communication between their users but act as indicators of their own function, a kind of '*architecture parlante*'. This, however, oversimplifies their meaning, and eliminates the role of suggestion in his work. The Umlauftank, to be sure, proclaims its use by accentuating the visibility of the circulation pipe, but this design cannot be completely understood without reference to its location alongside Berlin's east-west corridor, the Charlottenburger Tor and Ernst-Reuter Haus, which form a largely intact remnant of Albert Speer's plans for the city.<sup>12</sup> This contextual reading of the Umlauftank is supported by Leo's own 2m-long hand-drawn section of the building which includes the Charlottenburger Tor, and by photographs of design models that include the axis and Ernst-Reuter Haus. Is it entirely fanciful, then, to imagine the Umlauftank, with its north-facing brow and wrap-around glazing, as watching over this 'contaminated' landscape?<sup>13</sup> Is there intended to be a relationship between the columns of the Tor and the legs of the Umlauftank? The meaning of this remains elusive. Perhaps the overt usefulness of the Umlauftank can be seen as a rebuttal to the non-functional, largely scenographic role of Speer's planning, designed as a setting for Nazi spectacle. And yet at the same time, through its sheer sculptural bulk, the Umlauftank demands to be seen in relation to (and almost as part of the family of) the historically compromised monuments along Berlin's grand cross-city axis.

In all of this, Leo's work, not only with the Umlauftank but with each of his other six built and unbuilt projects, presents itself as another kind of architecture, one that seems to belatedly offer hope to Robin Evans' dismissal of the last 200 years of architectural invention as universally anti-social. For Leo, intrinsic to his architecture is an underlying fascination in the human, and his belief, given insistence by history, that people are not only inherently social, but must, out of political necessity, be social. 'Otherwise', as he says, 'architecture is only a picture'.<sup>14</sup>

*The cumulative effect of architecture during the last two centuries has been like that of a general lobotomy performed on society at large, obliterating vast areas of social experience. It is employed more and more as a preventative measure; an agency for peace, security and segregation which, by its very nature, limits the horizon of experience... But on the other side of this definition, there is surely another kind of architecture that would seek to give full play to the things that have been so carefully masked by its anti-type; an architecture arising out of the deep fascination that draws people towards others; an architecture that recognises passion, carnality and sociality.*

Robin Evans, 'Figures, Doors and Passages', 1978

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1. Dieter Hoffmann-Axthelm, 'Ludwig Leo am Pariser Platz', *Werk, Bauen + Wohnen*, no 3, 1995, p 64.
2. Ludwig Leo, in conversation with Gregor Harbusch and Jürgen Patzak-Poor, unpublished notes, 2 March 2006.
3. Léon Krier, 'A Monument in Berlin', *Art Net*, 1975
4. Charles Jencks, *Bizarre Architecture* (New York: Rizzoli, 1979).
5. Gregor Harbusch, 'Ludwig Leo: Formen der Problemlösung', unpublished MA thesis in Fach Kunstgeschichte, Humboldt-Universität zu Berlin, 2006. Harbusch is currently writing a PhD at the ETH Zurich on Leo's work.
6. Hoffmann-Axthelm, *op cit*.
7. Photographs by Gerhard Ullmann appear in *Werk, Bauen + Wohnen*, no 1/2, 1995, pp 30-43.
8. Robin Evans, 'Figures, Doors and Passages', *Architectural Design*, no 4, 1978, pp 267-77, reprinted with some images and captions omitted in *Translations from Drawing to Building & Other Essays* (London: AA Publications, 1997), pp 55-92.
9. Robin Evans, *ibid*, p 276. As Harbusch has pointed out, Evans' use of Catherine Bauer's *Modern Housing* as his source leads to a misrepresentation of Klein's *Flurlose Wohnung*, which is, in fact, distinctly matrix-like. But Evans' image is so compelling that Klein continues to be falsely characterised in the English-speaking world as the architect of 'frictionless living'. Coincidentally, Leo turns out to have been an admirer of Klein's work.
10. Gregor Harbusch, *op cit*, p 15. CIAM 9 marked the formation of Team 10, but the Smithsons do not appear to have noticed the Eichkamp presentation, which was probably part of Commission 3, 'Formation of the Architect' (see Alison Smithson, *Team 10 Meetings*, New York, 1991, pp 17-20). There is also no reference to Eichkamp in Eric Mumford, *The CIAM Discourse on Urbanism, 1928-1960* (Cambridge, MA: MIT Press, 2000). For the early history of Eichkamp see Conrad Albrecht, '60 Jahre Eichkamp: Wohnheim-Feeling mit Tradition', <http://virtual-eichkamp.com/modules/news/article.php?storyid=7>
11. Ludwig Leo, in conversation with Gregor Harbusch and Jürgen Patzak-Poor, *op cit*.
12. The Charlottenburger Tor and Brücke (1909) were widened in 1938 as part of the planning for the east-west axis; the Haus des Deutschen Gemeindetages (1938) was renamed Ernst-Reuter-Haus in 1953.
13. The word *kontaminiert* is used in this sense by Leo in his description of his Akademie project ('Die Akademie der Künste: Achtzehn Entwürfe', Berlin, 1995, p 135). His reference to the history of the site in that project supports the idea of a contextual reading of the Umlauftank.
14. 'Gute Architektur ist sozial justiert, sonst ist sie nur ein Bild' – Ludwig Leo in conversation with Gregor Harbusch and Jürgen Patzak-Poor, unpublished notes, 17 August 2006.

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