



A Screen that Receives Images by Radio

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A Screen that Receives Images by Radio

Richard Anderson



Vladimir and Georgii Stenberg, *Radio*, 1929,
on the cover of *Krasnaia niva*, no 14, 1929

The First Congress of Constructivist Architects, which took place in Moscow on 7 May 1929, was organised to showcase the achievements of the Union of Contemporary Architects (OSA), founded by Moisei Ginzburg and Aleksandr Vesnin in 1925. It was also meant to represent the leading voices of the constructivist architectural field. That is why Ivan Leonidov's presentation left the congress feeling distinctly unsettled.¹ His project for a workers' 'club of a new social type' challenged both the conventions of constructivist practice and the regime of representation that underpinned Soviet cultural life. Abandoning a tight articulation of form and function, Leonidov housed a diverse programme in a pair of parabolic domes, a low, wide-span plinth and a series of identical cubic volumes. Most workers' clubs – which were essentially community centres built near factories or in residential districts – had at their core a theatre, but Leonidov rejected the stage and its players outright. In his project the planetarium usurped the theatre's place, elevating scientific representation above dramatic entertainment. A botanical garden, athletic facilities, gymnasium, a library, fields for demonstrations, a children's sector and spaces for the reception of broadcast media completed the club's programme. The project bore little outward resemblance to architecture as it had been practised since the early 1920s. To some it did not look like architecture at all. But the radically new relationships that Leonidov established among form, space and media initiated a new approach to constructivism, one that made the organisation of media infrastructures a fundamental concern of the architect.

Dismayed by what appeared to be a lack of functional differentiation in Leonidov's project, one member of the congress directed a pointed question at the young architect: 'What, other than aesthetic-formal considerations, can explain your use of identical forms for different functions?'² The question tacitly appealed to Ginzburg's warnings against the canonisation of formal models and his definition of form as an 'unknown x' that the architect must always discover anew.³ Compared to Ginzburg's notion of the 'constant change' of architectural form according to functional requirements, the remarkable consistency of Leonidov's project – two domes, five cubes, one plinth – seemed a threat to OSA's core principles. To the suggestion that his project was founded on aesthetic considerations, Leonidov replied that architecture is not art, much less an exercise in form:

The question indicates that the speaker is interested above all in relishing external form, not in organisation. Such a question is valid for those who practise idealistic architecture 'as art', but for us, form is the result of organisation and the functional interdependencies of working and

*constructive moments. One should criticise not form but methods of cultural organisation.*⁴

Leonidov repeatedly asserted the subordination of form to organisation in the pages of *Sovremennaiia arkhitektura* (Contemporary Architecture, SA), which recorded both the dialogue that Leonidov provoked and the presentation he delivered.⁵ Sadly, much of the original material of Leonidov's project has been lost. Only five small drawings (all about 23cm long) and two photographs are known to survive.⁶ The drawings include plans and elevations in ink and pasted printed material. The richest sources of documentation on Leonidov's project, which comprised photographs, photomontages, a model and a series of presentation boards, are the seven full pages devoted to it in SA no 3, 1929.

Dirigibles, motorcycles, gymnastics, cinema, hot-air balloons, aerial photography and 'a screen that receives images by radio' all featured on the presentation boards as the basic elements of Leonidov's model of Soviet culture. Alone, each of these elements fitted well with the constructivists' embrace of social and technological progress, but Leonidov used them in combination to describe a provocative model of cultural organisation to the congress. Under the heading 'what not to show or build', one board struck out clubs by Leonidov's contemporaries – notably several designed by Konstantin Melnikov – and theatrical entertainment as such. Other panels questioned the value of painting for Soviet culture, demanded an end to ballet as a form of entertainment, cast dramatic cinema as outmoded and rejected the validity of music as a cultural form. Together, Leonidov's presentation boards amount to a critique of a culture that valued artifice over reality, absorption over engagement and material over media.

A so-called 'schema of spatial culture-organisation' integrated the buildings and media infrastructures that constitute Leonidov's 'club of a new social type'. This diagram of segmental arcs radiating across an abstract landscape seemed opaque to Leonidov's audience. Here, each building appears as a node that bears significance equal to its potential for cultural dissemination and reception. The curves of the diagram identify cultural centres with transmitters of electro-magnetic signals, suggesting that Leonidov understood culture – or cultural organisation – as no longer a problem of absolute space and distance, but rather as a function of signal strength. The points in Leonidov's diagram elide the difference between the club as material architecture and the club as site of immaterial media exchange. The ethereal quality of Leonidov's

Opposite: Ivan Leonidov, 'Schema of Spatial Culture-Organisation', from Club of a New Social Type, 1928–29 © Schusev State Museum of Architecture, Moscow

schema of cultural organisation must have seemed an affront to his fellow constructivists who, as a rule, were concerned with materiality.

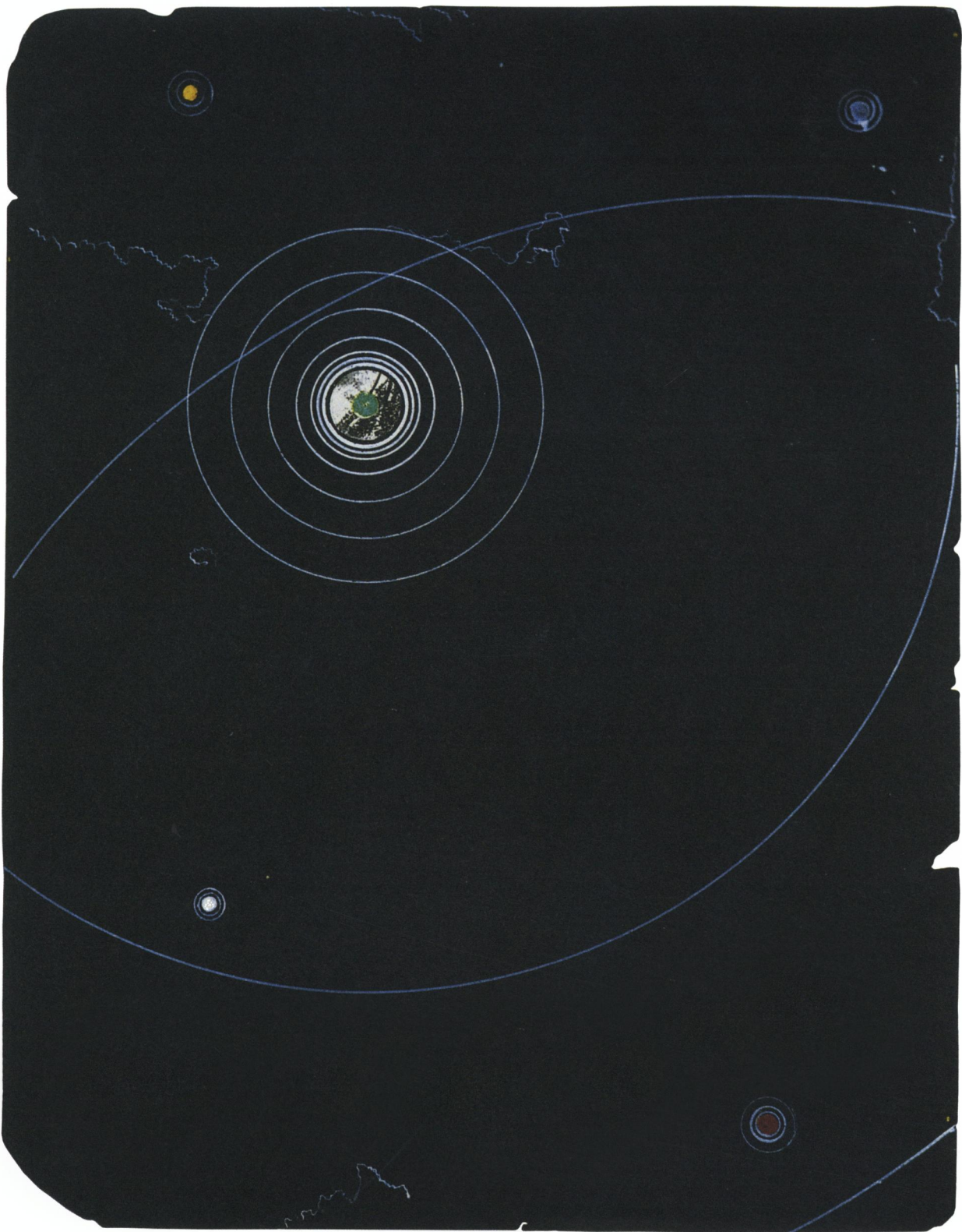
Baffled by this diagram, and by the project as a whole, one frustrated architect called out during Leonidov's presentation to the congress: 'What is this, a fantasy or a project?' Leonidov demonstrated his wit with his reply: 'It depends on one's understanding; for some Soviet power is not power but a fantasy.' His reply also revealed the importance of the project to Leonidov's approach to architecture. It showed that he considered the 'club of a new social type' not simply a site of cultural relaxation, but as a point in a new cultural field defined by emergent forms of broadcast media. With his club, Leonidov sought to embed Soviet culture within a new logic of social, spatial and media relations. In doing so, he articulated a distinct position within architectural constructivism, one that addressed not the organisation of material and space but rather the organisation of media networks and their spatial consequences.⁷

The unusual questions posed by the audience at the First Congress of Constructivist Architects indicate that Leonidov's assault on traditional cultural forms had struck a nerve. Would singing be allowed in this club? Had he considered the effects of his design on people's emotions? Might vision, too, be organised in this environment? In one exchange, an exasperated listener questioned Leonidov's relationship to the Soviet Union's most important broadcast medium:

Question: If you reject music, then what should be heard on the radio?

Answer: Life.

The 'life' to which Leonidov referred was in flux in 1929. It was being collectivised and recast by the USSR's First Five-Year Plan, a campaign for industrialisation that reached breakneck speed in the late 1920s. A corresponding 'cultural revolution' sought to accelerate this drive for modernisation even more.⁸ Architects proposed new models of communal housing and reformulated the workers' club in an attempt to create what Ginzburg had called 'social condensers for a new way of life'.⁹ The dream of the planned economy placed architectural work in a new register: Leonidov and his fellow constructivist architects were part of a widespread effort to socialise the human environment. Leonidov pushed this impulse further than many of his contemporaries. Indeed, the terms associated with his project – fantasy, music, emotion, vision, life – indicate that he sought to use architecture to operate not only on the material artefacts of everyday life but on subjectivity itself. He would assert that 'emotions and perceptions are not mere abstractions, inaccessible to scientific analysis.'¹⁰ And he believed the



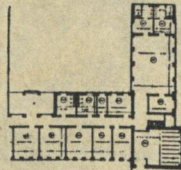
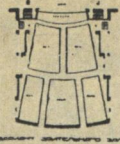
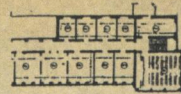
СУЩЕСТВУЮЩИЙ ТИП КЛУБА

Работа большинства наших архитекторов над организацией типа клуба отчетливо видна хотя бы из описания типового клуба инженера Г. Вольфензона (помещенного в «Строительной промышленности» от 1 января 1928 г.).

Отсюда ясно, что т. Вольфензон никаких проблем культурной организации рабочего класса в своем клубе не ставил и их не пытался разрешить.

...Культурно-просветительная работа профсоюзов должна широко обслуживать непосредственные запросы и нужды рабочих масс, создавая культурно-бытовые условия для обеспечения всестороннего развития рабочих и организуя для них культурный отдых и развлечения. В связи с этим культурно-просветительная работа профсоюзов **ДОЛЖНА** охватить действительно широчайшие массы рабочего класса, **ИЗЖИТЬ ЭЛЕМЕНТЫ АПОЛИТИЧНОСТИ И ОГРАНИЧЕННОГО КУЛЬТУРНИЧЕСТВА, ПО-НОВОМУ ПЕРЕСТРОИТЬ СВОИ МЕТОДЫ И НА ДЕЛЕ ЗАНЯТЬ ВАЖНЕЙШЕЕ МЕСТО ПО ВСЕЙ РАБОТЕ профсоюзов.**

Публикуемая работа автора исходит в первую очередь именно из задач стройки новой культуры рабочего класса средствами современной науки и техники.



ба на 1000 человек. Вольфензон

На рис. 6 и 7 приводится проект рабочего клуба, спроектированного автором настоящей статьи для рабочих текстильного предприятия.

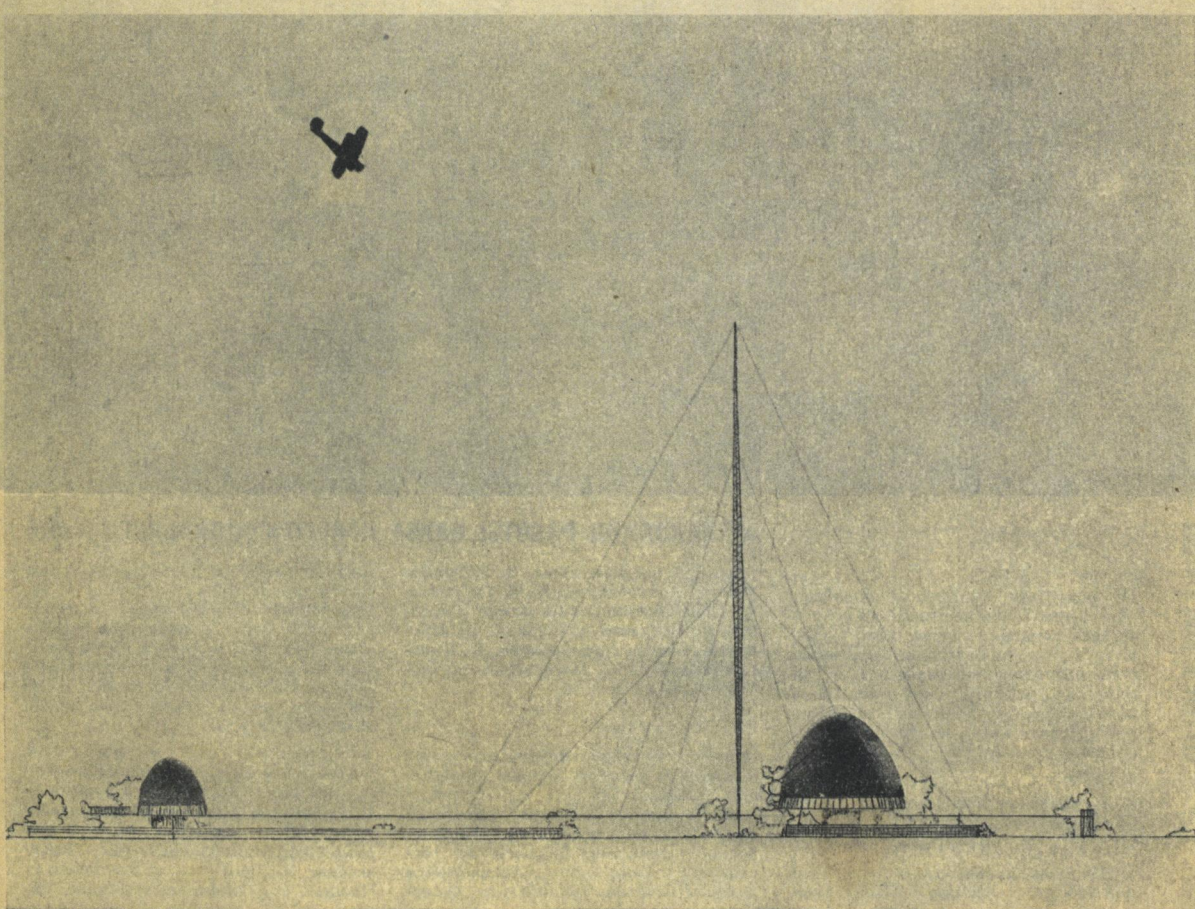
Приводимый проект клуба представляет собой двухэтажное каменное здание. Театральная часть состоит из зрительного зала на 1000 человек площадью в 490 кв. метров. Часть мест расположена на балконе зрительного зала. К последнему ведут две лестницы: одна непосредственно из раздевальной, другая из фойе.

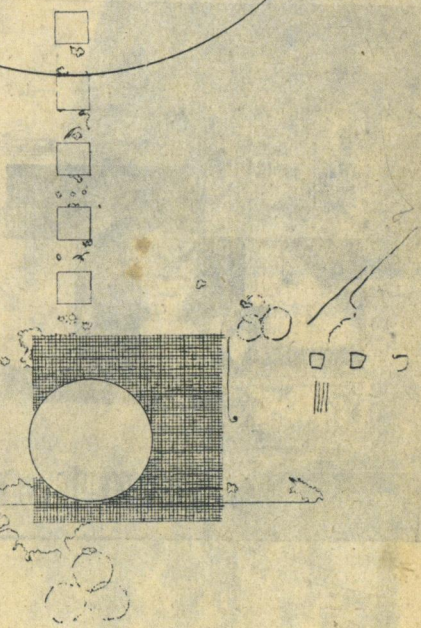
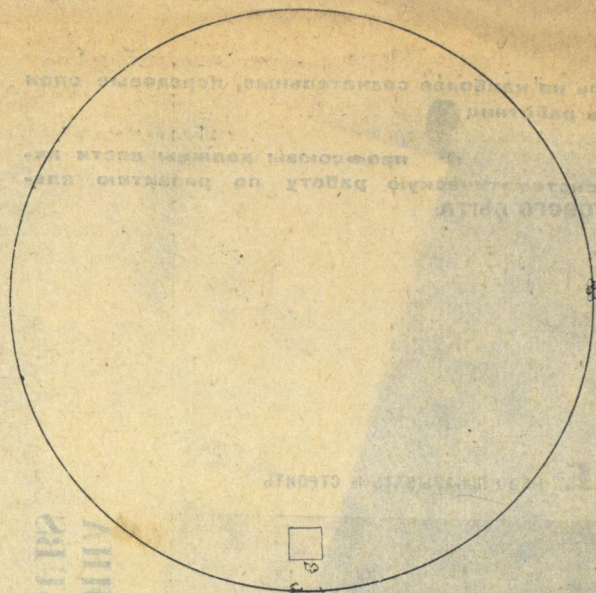
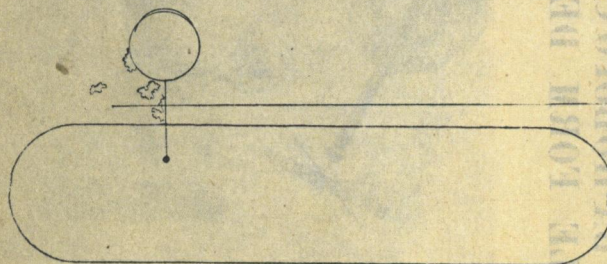
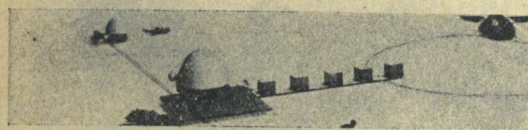
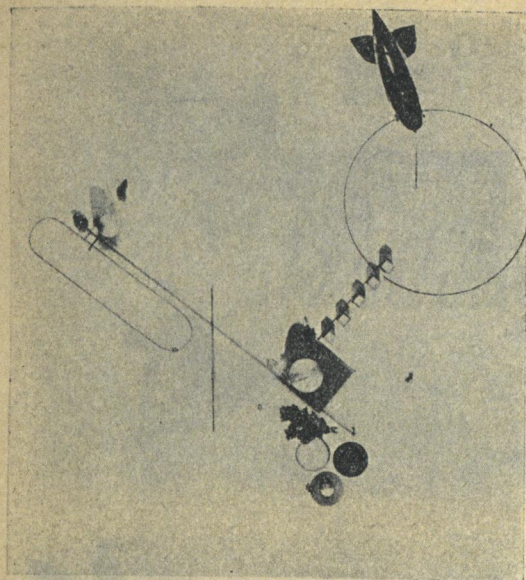
Сцена шириной портала в 10 метров и в глубину 10,5 метра. Над сценой устроены колосники. При сцене в 1 1/2 этаже расположены обслуживающие помещения: вестибюль артистов, режиссерская, фойе артистов, 2 уборные по 20 кв. метров, 2 уборные по 10 кв. метров, склады бутафории, костюмов, декорации и мебели.

Из числа клубных помещений в 1 этаже сосредоточены комнаты для кружковых занятий, не требующих тишины, а именно, кружки: музыкальный, оркестровый, хоровой, драматический—по 40 кв. метров, и молодежь, пионеров, правления—по 30 кв. метров. Тут же отдельный вестибюль непосредственно сообщается с гимнастическим залом.

Во 2 этаже клубной части сосредоточены 4 оiolнотечных комнаты (всего 80 кв. метров), комнаты для рисования, курсов кройки, детская и изолированная комната отдыха. Здесь же расположена аудитория на 80 человек. При гимнастическом зале имеются комнаты для переодевания с умывальником и душами.

Гр. инж. Г. Вольфензон.





ВАРИАНТ А. ПЛАН 2 ЭТАЖА

скетбол, крокет, шахматы, шашки и т. д., д) Бассейн, е) Детская и пионерская площадка, ж) Радио, з) Кино-газеты, и) Уголки общественно-политической работы, к) Демонстрационные площадки.

2. Зал площадью 700 кв. м. для лекций, кино, демонстраций, планетария, собраний и т. д.
3. Библиотека с читальней площадью 200 кв. м.
4. Для углубленно-аналитической работы 8 лабораторий по 100 кв. м.
5. Демонстрационное поле (открытое) для больших демонстраций (планерное состязание, воздухоплавание, авиация, авто-спорт, газовые демонстрации, военные игры, туризм и т. д.).
6. Спортивный зал с подсобными помещениями, площ. 400 кв. м.
7. Спорт-площадка.
8. Детский павильон с площадками и бассейном.
9. Парк.

Помимо клуба самодеятельной организации культуры проектируется устройство экранов с радиорупорами, на которые посредством радио и телевидения передаются все политические и хозяйственные события дня, работа клуба, научных институтов и т. д.

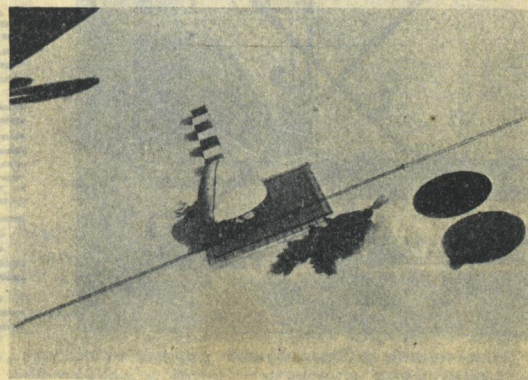
Своего рода живая газета, которая должна быть неотъемлемой принадлежностью каждого рабочего и крестьянского коллектива.

Материал:

Оболочка главным образом, из стекла и несущая конструкция из железобетона. До сих пор стена являлась глав-

ным образом тепло-звукоизолятором и источником света. Сегодняшние технические условия позволяют делать стену не изолирующей от окружающей жизни—непрозрачным, каменным или деревянным массивом а прозрачной стеклянной, тем самым расширяющей охват человеком бытовой обстановки в ее динамике.

ФОТО-МАКЕТ. ВАРИАНТ А

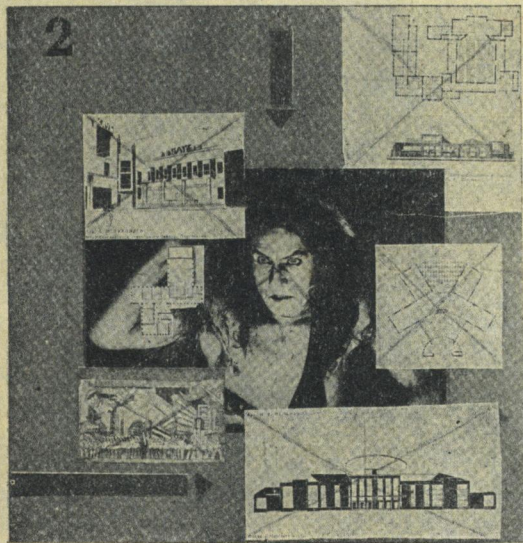


И. И. ЛЕОНИДОВ.
ПРОЕКТ КЛУБА
НОВОГО СОЦИАЛЬНОГО ТИПА

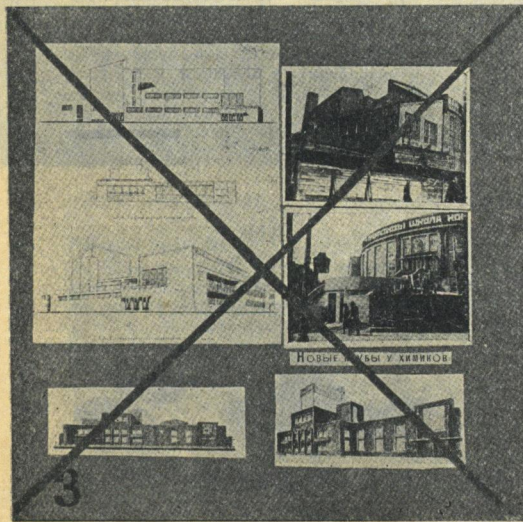
...Опираясь на наиболее сознательные, передовые слои рабочих и работниц

профсоюзы должны вести активную систематическую работу по развитию элементов **НОВОГО БЫТА**

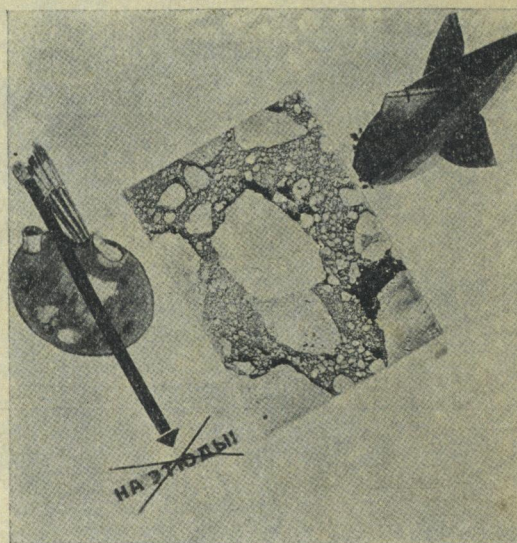
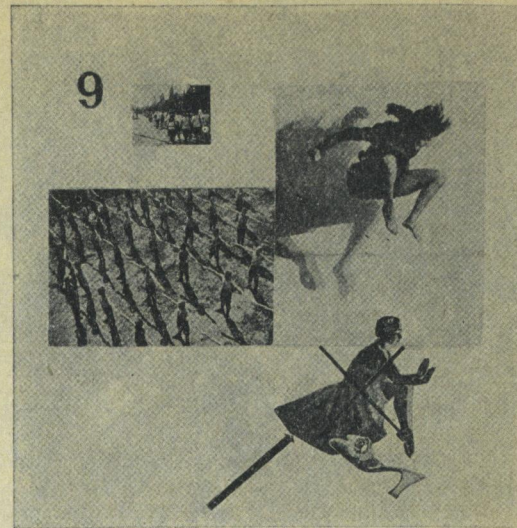
ЧТО **НЕ** НАДО ПОКАЗЫВАТЬ И СТРОИТЬ



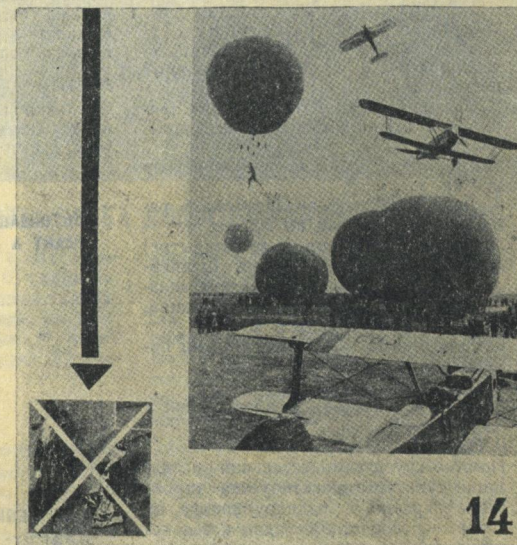
КАК **НЕ** НАДО СТРОИТЬ



**И. И. ЛЕОНИДОВ. ПРОЕКТ КЛУБА НОВОГО СОЦИАЛЬНОГО ТИПА
I. LEONIDOFF. NEUE SOCIALE FORM DES ARBEITERKLUBS**



ПРИРОДА С ПАЛЕТЫ И ДИРИЖАБЛЯ



ВМЕСТО ТЕАТРА

ЧЕЛОВЕК НА СЛУЖБЕ У ТЕХНИКИ И ТЕХНИКА НА СЛУЖБЕ У ЧЕЛОВЕКА

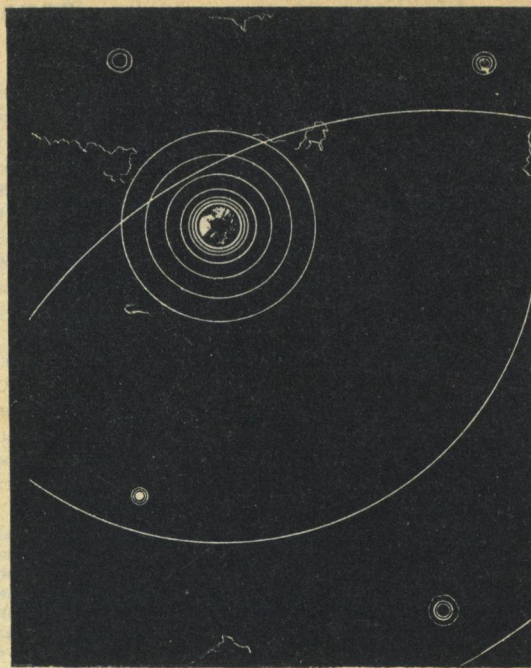
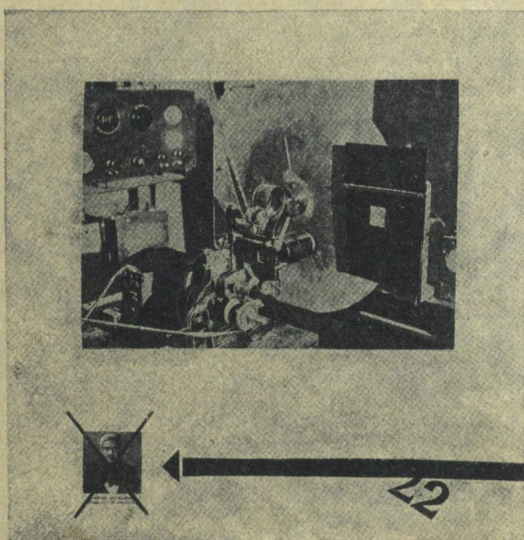
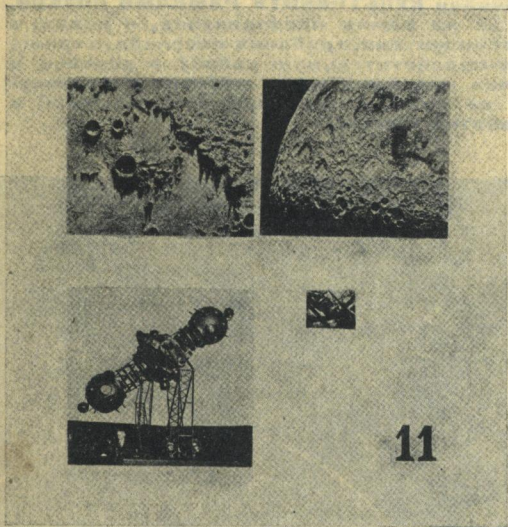
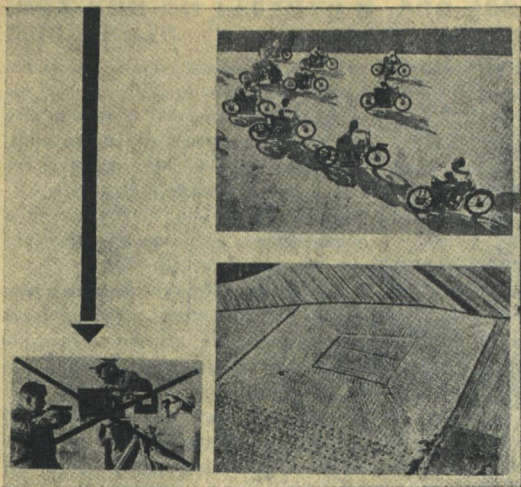


СХЕМА ПРОСТРАНСТВЕННОЙ КУЛЬТОРГАНИЗАЦИИ



ЭКРАН ПРИНИМАЮЩИЙ ПЕРЕДАЧУ ИЗОБРАЖЕНИЯ ПО РАДИО

ГОСОРГАНЫ должны усилить свою помощь культурно-просветительной работе профсоюзов в целях более широкого обслуживания членов профсоюзов и их семей.

Со стороны госорганов необходимо в первую очередь обеспечить кредитование клубного строительства, предоставление помещений и земельных участков под клубы и физкультурные сооружения и т. п.

visual faculty provided the most direct access to the elements of subjectivity: 'The eye is an accurate mechanism that transmits the visible to consciousness.'¹¹ Through the organisation of perception Leonidov sought to intervene at the intersection of vision and subjectivity.¹² In the process, he engaged with discourses and practices outside the regular orbit of constructivist architecture. His appropriation of procedures from the visual arts – photography, film and montage – demonstrates that his was an architecture born of modern media, emerging fully aware of a distinction that Friedrich Kittler articulated with great clarity: machines can take over functions of the central nervous system and not only the functions of muscles.¹³ This distinction helps us better understand Leonidov's work and his singularity within the constructivist architectural field, for it posits a conception of subjectivity based on a reciprocal relationship between human beings and technological apparatuses. The promise of listening to life on the radio captures this interdependence, as does Leonidov's slogan for his project: 'man at the service of technology and technology at the service of man'.

Born in 1902, Leonidov came to be known early on as the *enfant terrible* of the Soviet architectural vanguard. He spent his childhood in a provincial district outside of Moscow, and was largely self-taught in drawing and painting before he entered the revolutionary art school VKHUTEMAS in 1921. There he joined the group of young architects and students gathered around Ginzburg and the Vesnin brothers and became a member of OSA. But despite Leonidov's commitment to OSA's constructivist principles, he always stood apart from the group. His thesis project for a 'Lenin Institute of Library Sciences' of 1927 marked a radical departure for Soviet architecture. Composed of simple geometric volumes – a sphere for an auditorium and planetarium; rectangular prisms for book stacks; and a disk for a base – the Lenin Institute introduced an approach to space and design that disregarded the constraints of rectilinear geometries. The project earned Leonidov both enthusiastic followers and bitter, sceptical rivals. It also established his reputation as a petulant young architect whose interests lay in visionary projects, not material buildings.

The Lenin Institute also launched Leonidov onto the international stage when the German publication *Wasmuths Monatshefte für Baukunst* featured it on the cover of its March 1929 issue, giving the 27-year-old architect unsolicited publicity only months before he presented his project for a 'club of a new social type'. But the attention that Werner Hegemann, the journal's editor, focused on Leonidov's work was tinged with scepticism. The caption added to the cover photograph of his model was an invitation to

ridicule: 'Auditorium, light bulb or balloon?' Inside, Hegemann criticised what he considered to be the naive symbolism of Leonidov's Lenin Institute: the sphere and its support structure symbols of the upward movement of a hot-air balloon, and the glazed auditorium just a crude metaphor for enlightenment.¹⁴

Hegemann may have taken a narrow view of Leonidov's project, but the publicity that he and others devoted to the Lenin Institute would elevate it to canonical status: along with Tatlin's 'Monument to the Third International', it has become an enigmatic symbol of the Soviet architectural vanguard. When Alison and Peter Smithson sought out Soviet material for their dossier on the 'Heroic Period of Modern Architecture' in *Architectural Design*, they enlisted Leonidov's library project.¹⁵ Anatole Kopp also used this work to advertise his *Ville et révolution* of 1967, one of the first serious attempts at interpreting the output of the architecture of the 1920s in the USSR.¹⁶ Likewise, the legacy of Leonidov's work extended to the 1970s, when it was taken up and adapted by Rem Koolhaas and others.¹⁷

But the attention historians and architects have given to Leonidov's diploma project has obscured his work in other fields, particularly in graphic design and photomontage, both areas he explored in *SA*. While the initial graphic form of the journal was conceived by Aleksei Gan in 1926, later issues were designed by Varvara Stepanova, Solomon Telingater and Leonidov himself, who was responsible for the layout of the entire first issue of 1928. Later that year, Leonidov published a series of polemical photomontages in *SA* as a response to the tenth anniversary of the October Revolution.¹⁸ While most periodicals commemorated the event with tributes to the building industry, he marked the occasion with a scathing critique of contemporary architecture. His multi-page sequence opens with an image of Moscow's Central Telegraph Office, which was designed by Ivan Rerberg and completed in 1929. An x, drawn with a thin line of ink, strikes out the entire structure. Below, a bold-face caption reads 'how not to build'. In a gloss on the image Leonidov wrote 'It is a great leap, only backward, not forward, even to pre-revolutionary classicism and to the unprincipled ideology of the mercantile contracts of old Moscow.'¹⁹ The tone of Leonidov's gesture reflected his bitterness, shared by members of OSA, that the Vesnin brothers' design for the Central Telegraph had been rejected in favour of a project they considered to be old-fashioned, if not eclectic. The following pages of Leonidov's series are filled with similar provocations. He criticised both the design and

Previous: Pages from Sovremennaia arkhitektura, no 3, 1929, presenting Ivan Leonidov's Club of a New Social Type
© British Library Board (BLL01007313714)

expense of the neo-renaissance addition to the Soviet Union's state bank, a project by the elder Palladian architect Ivan Zholtovskii. And by drawing in crosses on the pinnacles of competition projects for a new train station in Kiev, he imputed religious inspiration to what he viewed as backward-looking designs. Leonidov called his scrapbook of retrograde tributes to the October Revolution an *arkhitekturnaia kunstkamera*, a 'cabinet of architectural curiosities'. With this work he demonstrated both the value of photomontage for architectural discourse and the importance of this practice to his own, polemical approach to design.

Leonidov was careful to render the sources of his graphic material clear to the readers of his 'cabinet of architectural curiosities'. On the opening page of the series, the cropping of the image of Rerberg's Central Telegraph includes the caption from its original place of publication in *Stroitel'stvo Moskvy* (Construction of Moscow). Likewise, the page devoted to Zholtovskii's state bank includes both the article title and significant portions of text from its initial publication in the same journal. Throughout his 'cabinet of architectural curiosities', Leonidov consistently called attention to the fact that he was reproducing not a set of images, but collecting a series of documents.

By asserting the documentary character of his collection, Leonidov linked his work to the strategies developed by artists such as Gustav Klucis and Aleksandr Rodchenko. In a text first published anonymously in the journal *Lef* in 1924, Klucis had praised Paul Citroen's widely circulated photomontage *Metropolis* for its evocation of the dizzying scale and fragmentation characteristic of the modern city. For Klucis, the power of the image lay in its construction from photographic snapshots, not traditional graphic techniques. He wrote that the 'precision and documentary character of the snapshot have an impact on the viewer that a graphic depiction can never attain'.²⁰ The photomontage, by offering a 'precise record' of the visual world, could obtain a force and legitimacy in its transmission of images that was unavailable to traditional representational media. Rodchenko's montaged book illustrations, notably for Vladimir Mayakovskii's poem 'Pro eto' (1923), are among the most celebrated Soviet experiments with the technique. But Rodchenko's interest in the documentary character of photomontage appeared most clearly in a series of posters on the history of the Bolshevik party in 1925.²¹ In this series, he rejected a totalising, synthetic view of the history of the party and instead constructed a dense and fragmentary narrative composed of photo-mechanically reproduced artefacts. Photographs, newspapers, maps, pages from books and images of party leaders are presented in the posters as a series of facts for the viewer's interpretation. When

Rodchenko published his posters in the pages of *Novyi Lef* in 1927, he boasted that the work was 'done with photographic means and constructed from genuine documents'.²²

Leonidov appealed to this documentary impulse in the graphic presentation of his 'club of a new social type' in the pages of *SA*. He began not with a discussion of his design but rather with a critique of the work of his contemporaries. At the top left corner of the opening page stand the words 'The Existing Type of Club'. The paragraph of text beneath this headline identified the work of Georgii Vol'fenzon as a typical response to the programme of the workers' club. To the right of this, Leonidov reproduced a large clipping from the journal *Stroitel'naiia promyshlennost'* (Building Industry), in which Vol'fenzon's project for a typified club first appeared. Following the procedures established in his 'cabinet of architectural curiosities', Leonidov emphasised the documentary character of his source material. This tactic allowed him to ground his argument in the legitimate artefacts of architectural discourse and at the same time enabled him to present Vol'fenzon's club as but another specimen of misguided architectural production.

At the centre of Vol'fenzon's project for a typical club – and immediately recognisable in Leonidov's presentation of the work – is a theatre. Intended for the workers of a textile factory, the building was to house an auditorium large enough to seat 1,000 spectators. A portion of the seats were located in a balcony and the stage had nearly cubic dimensions: 10m wide × 10.5m deep. Various rooms for stage sets and costumes were accommodated on a mezzanine floor, while the ground floor contained rooms for study, rooms for musical, orchestral and dramatic rehearsals, and a room for gymnastics. On the second floor were rooms for drawing and courses in pattern-making. Suggesting that this project remained tied to the trappings of bourgeois culture, Leonidov wrote that 'it is clear that comrade Vol'fenzon has not raised any problems for the cultural organisation of the working class with his club and has not tried to solve any either'.²³

Vol'fenzon's club was thus presented as a counter-model to the 'club of a new social type'. For Vol'fenzon, the club was a setting for musical rehearsals and popular theatre; for Leonidov, it was a site that offered visitors 'familiarisation with scientific and everyday facts' through radio and film. During his presentation to the First Congress of Constructivist Architects, Leonidov made his opposition to theatre clear, stating that 'it has outlived its cultural role thanks to the primitiveness of its methods and technology'.²⁴ The 'club of a new social type' was to be a place of edification, not entertainment, and the novelty of Leonidov's

architectural forms reflects this stance. Vol'fenzon's club conforms to the typology of the theatre: concentric rows of seating extend from the proscenium to the back of the auditorium, thereby focusing the attention of the audience on the stage and establishing direct lines of sight. Leonidov's club, in contrast, lacks this spatial focus and directionality and is instead composed of circular forms, gridded frames and cubic volumes. He seems at pains to avoid the spatial arrangements characteristic of the theatre and the perspectival experience of spectatorship which it generates.

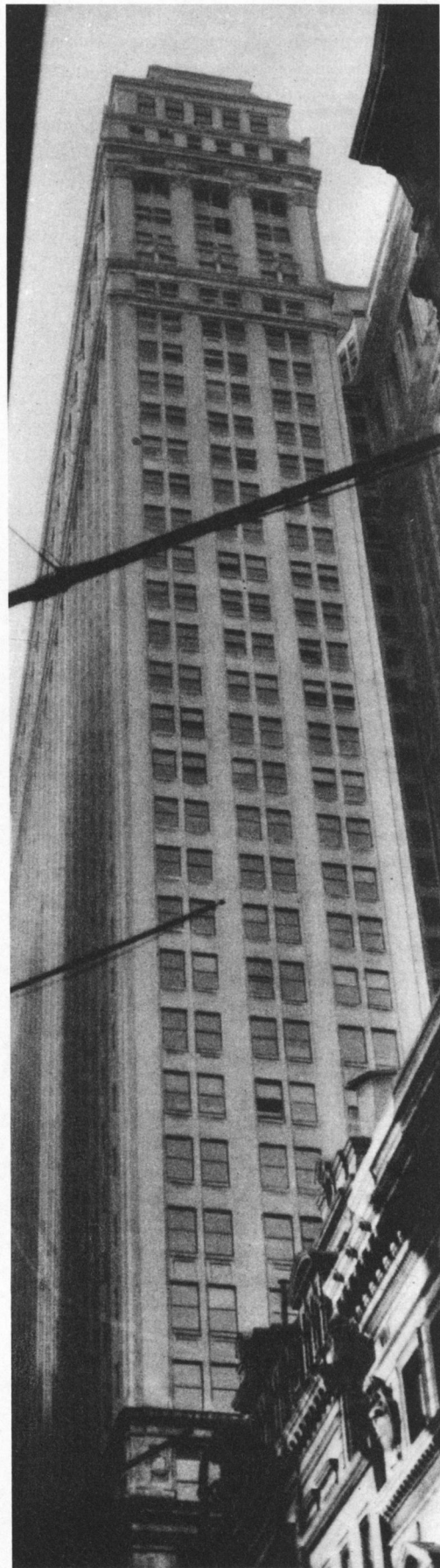
The photographic panels that accompany the project articulate Leonidov's opposition not just to theatre as a form of spectacular entertainment, but to the spatial relationships on which traditional theatre was founded. In one presentation panel, the negation of drama appears as a crossed-out image of an actor in costume and makeup; on the same presentation board, the negation of the theatre as a spatial programme appears as crossed-out images of workers' clubs, one of which was Melnikov's innovative club for a china factory just outside Moscow.²⁵ Identifying dramatic action (the actor with a frozen gaze) with the clubs (and theatres) of his contemporaries and uniting them under the heading 'what not to show or build', Leonidov pointed to their shared, if not complementary, roots in the artifice of theatricality. In Leonidov's club, the dome of the planetarium, with its circular, omnidirectional geometry, figures as a site for the dissemination of 'scientific and everyday facts'; the axial quality of Vol'fenzon's or Melnikov's auditoria remains linked, in the logic of Leonidov's presentation, with the spectacle of theatre.

Together, the montages that make up Leonidov's presentation demonstrate his conviction that contemporary technology and media infrastructures were no longer bound to the spatial relationships associated with theatre. His interest in the new spaces of perception afforded by modern technology is evident in a panel marked with the number 14. Here, a small photograph of what appears to be a melodramatic theatrical performance is struck through with a large x and juxtaposed with a large photograph of an air show. The caption at the side reads 'in place of theatre'. Another panel extends his critique of representation to painting itself: a crossed-out palette and a dirigible flank a photograph of a natural landscape, suggesting that painting cannot capture the points of view offered by the hovering, lighter-than-air ship and the camera. Similarly, Leonidov suggested that dramatic cinema, such as the scene of a bandit pointing a gun at a camera presented at the lower left corner of one of his panels, pales in comparison to the facts of everyday life recorded from new heights.

Leonidov relied on material from the contemporary photographic press to clarify his position. Many of the images in his presentation panels were drawn from *Sovetskoe foto* (Soviet Photo), a leading professional journal. He made particular use of photographs from extreme angles: images of spaces seen from above or below. The work of Robert Petschow, a German pioneer of aerial photography, figured prominently.²⁶ In one of Leonidov's presentation panels, Petschow's image of a field after harvest and a photograph of a motorcycle rally in Nuremberg are juxtaposed with an image of the production of a dramatic film, which Leonidov marked with a large x. This panel highlights several aspects of Leonidov's project. It registers the power of photography to record abstract, yet authentic images of the real world. Leonidov appears to celebrate the precise documentation of everyday life – as opposed to its dramatic re-creation – in film. At the same time, this panel aligns Leonidov's interests in photography and film with concerns shared by such artists as Aleksandr Rodchenko and László Moholy-Nagy, each of whom exploited extreme angles in the mid-1920s. As a careful reader of *Sovetskoe foto*, Leonidov would have been aware of the controversy that unfolded on the journal's pages when an anonymous attack was levelled at Rodchenko for allegedly copying the oblique angle from western bourgeois photographers, including Moholy-Nagy.²⁷

The unconventional framing of the landscapes and objects in these images destabilises spatial relationships. Seen from above, as in Petschow's photograph, the landscape lacks a horizon. This condition renders the directionality of the image unclear and stands in direct contrast to the self-evident orientation of the image of a film production that Leonidov selected for his presentation board. An image such as Petschow's (or select works by Rodchenko or Moholy-Nagy) introduces a spatiality that seems no longer bound to the orthogonal structure of perspectival vision, a spatiality that can accommodate multi-directional space.

Leonidov explored the effects of this spatiality on architectural design in his 'club of a new social type'. He did this by abandoning a model of spectatorship based on the pyramidal vectors of perspective – which underpin both traditional theatre and traditional models of spectatorship – and adopting a model based on the omnidirectional radiation of electromagnetic signals. This is evident in his 'schema of spatial culture-organisation'. In this image, major and minor nodes generate circular waves that travel across an abstract landscape. The broad segmented arcs suggest the presence of distant cultural centres capable of sending and receiving signals over vast territories. The lack of scale and the absence of recognisable architectural forms make the space of the image



Erich Mendelsohn, Equitable Building, New York City, from Erich Mendelsohn, *Amerika: Bilderbuch eines Architekten* (1926)

difficult to interpret. The relationships among the points within the schema appear to be governed not by geometry, but rather by a topological relationship among nodes. Space-time relationships are defined not by distance, but by signal strength. Spatial continuity is fragmented as media infrastructures obtain coherence.

Leonidov's images and his model of cultural organisation were influenced by contemporary interests in the spatiality of radio waves. While scientists charted the global expanse of radio signals and attempted to capture photographic representations of signal frequency, Leonidov radicalised the technological research unfolding around him, seeking to embed architecture within the new spatial relationships created by broadcast media. This meant approaching radio as both a figure of spatial extension and a model of sociability. In the image Vladimir and Georgii Stenberg created for the cover of *Krasnaia niva* (Red Virgin Soil) no 14, 1929, headphones and loudspeakers articulate the individual and the collective in this radio-logic of social relations. The smiling children in the image represent the potential of this model to accommodate individuated subjects; the crowd, seen below the lip of the megaphone, corresponds to the mass of the Soviet Union's collective audience. When Leonidov said that 'life' was to be heard on the radio, he imagined the act of listening taking place in a variety of spaces and on several scales: on the street and in the factory, as well as in the rural home and on personal headphones. The spatiality of this medium was both more flexible and less defined than the space of the theatre. It seemed to require a new conception of spectatorship and a new understanding of the way subjects interface with media. The spatial potential of radio reception also points to a key element of Leonidov's opposition to the stage: the transmission and organisation of culture, news and events no longer needed to be confined to the auditorium. Electromagnetic signals and speakers could unite audiences over vast, discontinuous distances, and Leonidov's 'club of a new social type' was conceived as a link – or even a hub – in this new fragmented landscape.

The medium of articulation in Leonidov's 'schema of spatial culture-organisation' is at once utterly abstract and uncannily familiar: using the Russian word, he called it *televidenie* – television, identifying the space of the club with broadcast technology. The final presentation panel displays an image of an unidentified city street and a number of circles and lines. At the lower left corner of the image is a series of concentric circles that recall the symbols for clubs in Leonidov's cultural schema. A zigzag line descends from the centre of the image of the street scene to a smaller set of concentric circles. The peaks and troughs of the line suggest circuit

breaks and the static of radio transmission. The panel's caption names the conjunction of photograph, circles and lines: 'A screen that receives images by radio'. In the 'schema of spatial culture-organisation' multiple systems of concentric circles represent major and minor architectural sites; in Leonidov's final presentation panel the figures composed of concentric circles represent devices for the reception and transmission of images and sound. This congruence of forms renders the difference between the club as architecture and the club as information relay difficult to discern.

Leonidov's identification of the club with the broadcast node indicates the central problematic of his project, for the club suspends architecture somewhere between object and infrastructure; between phenomenal space and diagram of cultural organisation; between matter and information. This tension within the project derives from the tension internal to the structure of television itself. As recent media theorists remind us, the unity of television involves a highly ambivalent simultaneity. In the words of Samuel Weber, 'It overcomes spatial distance but only by splitting the unity of place and with it the unity of everything that defines its identity with respect to place: events, bodies, subjects.'²⁸ An analogous splitting of place underpins Leonidov's media architecture, and the spatial tension within Leonidov's project poses an architectural response to a basic condition of modern life: discontinuity as a fact of perceptual experience.

Leonidov described the eye as 'an accurate mechanism that transmits the visible to consciousness'.²⁹ He shared this belief in the primacy of vision with other representatives of the Soviet avant-garde, many of whom theorised a new optical sensibility constituted by the coupling of the human eye and the machine. With perhaps more polemical force than any of Leonidov's contemporaries, the director Dziga Vertov identified mechanised vision with truth in what he called the *kino-glaz*, or cinema-eye. Vertov understood this compound perceptual device as 'the possibility of making the invisible visible, the unclear clear [and] the hidden manifest'.³⁰ Likewise, Rodchenko explored the potential of the camera-eye for still photography, demanding that photographers 'reveal the world of sight' and 'revolutionise our visual reasoning'.³¹

Leonidov displayed his sensitivity to contemporary photographic discourse in three images of a model of the 'club of a new social type' that were presented in the pages of SA as a quasi-cinematic series. Each depicts the model of the club from a different angle. In one, the large parabolic dome occupies the centre of the image: the ground plane is upturned, tilting toward the camera lens, while repetitive cubic volumes extend deep into space and horizontal

transmission lines traverse the frame at an oblique angle. The second image shows the model from a different vantage point. Here, the relationship between the central dome and horizontal plinth to the smaller, subsidiary dome is established. From the centre, the series of cubic volumes extends laterally toward an airship docking station. The final image presents the model from above, framing its objects in a strict perpendicular view. As a sequence, these images evoke a dynamic visual experience, as if the club were presented from an elevated, hovering position. It is as if Leonidov visualised his model as it might be seen from the window of an approaching airship.

It was no accident that Leonidov chose to present his 'club of a new social type' in a series of photographic views from above. His oblique and perpendicular photographic views were architectural responses to a central concern of Soviet visual culture – the relationship between geometric perspective and technological modernisation. The stakes of this relationship were clearly formulated by Rodchenko in a remarkable essay published in *Novyi Lef* in 1928, 'The Paths of Modern Photography', in which he asserted that photography and the metropolis posed serious challenges to the western tradition of representation.

Rodchenko staged his argument as a contest between media – painting versus photography – and concentrated on the spatial conditions of image production. In his words: 'Look ... [at the] history of painting ... and you'll see that all paintings, with some very minor exceptions, have been painted from the belly-button level or from eye level'.³² This pairing of body parts, the eye and the navel, suggests that his critique was twofold. 'Eye level' serves for Rodchenko as shorthand for the system of perspective that was first codified by Alberti. This system, in Hubert Damisch's compelling formulation, was an experiment 'aimed at nothing less than [the] construction of a structure of objectivity in which the subject had its assigned position'.³³ A plate from Jan Vredeman de Vries's treatise on perspective (1604) illustrates the structure of 'eye-level' representation that Rodchenko sought to undermine.³⁴ A man, a surrogate for the viewer, is seen from behind. His position is defined by the orthogonals that recede to infinity. Intersecting with the man's head and the horizon line at an ideal point in the distance, these lines lock the observer into a rigid visual matrix.

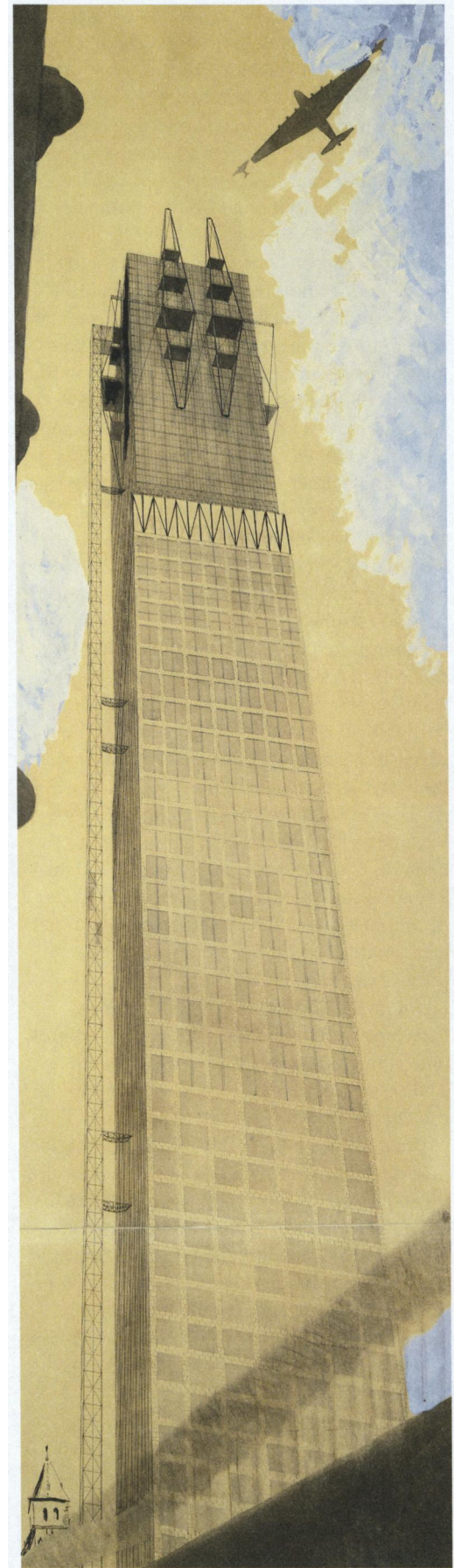
This binding of the body of the subject points to the other part of Rodchenko's formula. If he conceived the eye as an ideal point postulated by a geometrical construction, his allusion to a belly button suggested an analogous spatial framework. Cesare Cesariano's Vitruvian man describes this matrix. Inscribed within a circle and a square, superimposed on

a grid, navel pierced by both radius and hypotenuse, this figure represents a reciprocity between the concreteness of the microcosm (the individual body) and the extension of the macrocosm (the abstract geometry of matter). It symbolises the ideal construction of the world in the image of man. But Rodchenko believed that it was precisely this reciprocity between man and the world that was thrown into crisis by the scalar relationships produced by media technologies and the modern metropolis. The paradigm of renaissance man, in other words, was no longer commensurate with the spaces of lived experience.

Rodchenko demonstrated the difference between the belly-button perspective of traditional architectural photography and his new vision by comparing two images of Cass Gilbert's Woolworth Building in Lower Manhattan, both of which were illustrated in his article in *Novyi Lef*.³⁵ He wrote that one of the images had been taken in the most 'stereotyped manner', noting that 'because the adjacent buildings got in the way ... they were touched up'. 'That's the way it is', he continued, 'both Americans and Europeans brought up on the laws of correct perspective see America this way'.³⁶ The conventions of perspective, according to Rodchenko's argument, produce a mystification by confining visual experience to an ideal point situated on the horizon line. Rodchenko's counter example was drawn from Erich Mendelsohn's *Amerika: Bilderbuch eines Architekten*.³⁷ Mendelsohn published a photograph taken by the Danish architect Knud Lönberg-Holm of the Woolworth building seen from below, its vertical lines converging at a distant point high above the city. This image, Rodchenko claimed, was taken in 'an honest way', just as the man in the street would see it. But in addition to offering an 'honest' view of the city, a photograph such as Lönberg-Holm's offers a glimpse of the multiplicity of views available to sight once it is unhinged from the matrix of the belly-button view.

Rodchenko's account of the spatial conditions of modern photography addressed a concern shared by an international field of practitioners and theorists. Vertov deployed upward camera angles in his *Man with a Movie Camera*. The spatiality of such images was also celebrated by the critic and historian Sigfried Giedion, whose oblique photographs of the *pont transbordeur* in Marseilles featured prominently in his book *Bauen in Frankreich*.³⁸ Significantly, Giedion's photographs would inspire Walter Benjamin to reflect on the origins of this spatiality:

The magnificent vistas of the city provided by the new construction in iron ... for a long time were reserved exclusively for the workers and engineers... For in those days who besides the engineer and the proletarian had climbed the steps that alone made



Ivan Leonidov, project for the headquarters of the Commissariat of Heavy Industry, Moscow, 1934
© Schusev State Museum of Architecture, Moscow

*it possible to recognise what was new and decisive about these structures: the feeling of space?*³⁹

In addition to recognising the possibility that class positions might be embedded within vantage points, Benjamin's reflection highlights a link between oblique views – views similar to the photographs of Lönberg-Holm that Rodchenko praised – and a new experience of space. The 'feeling of space' that Benjamin described corresponds to the new spatiality which Rodchenko sought to capture in his images and which Leonidov sought to translate into architectural terms. For Rodchenko this spatiality was anti-perspectival – a position that was manifest at the very centre of his essay: his example of a 'conventionalised photograph' was, in fact, not a photograph at all. It was a drawing, rendered according to the strict rules of perspective by the delineator Hughson Hawley.⁴⁰ Thus the model of vision as a perspectival matrix emerges as one of Rodchenko's key targets in his argument for the greater 'honesty' of photography.

Interpreted in the context of Rodchenko's theoretical concerns, Leonidov's project acquires new definition. The oblique and perpendicular views that Leonidov presented of his model appear as inverted appeals to the 'honesty' of photography liberated from the confines of what Rodchenko called 'belly-button level'. In this way, the photographs of Leonidov's model simulate the world of sight as manifested in aerial observation. Considered in conjunction with the photographic material he assembled on his presentation boards, these images appear as potential elements of Leonidov's contemporary visual culture. Petschow's aerial photographs, among others, underline the fact that this spatiality was not a fantasy but a reality. Leonidov would develop this theme further in his urban projects, particularly in a memorable image of a dirigible hovering above his plan for a settlement in the industrial town of Magnitogorsk and in his project for the Headquarters of the Commissariat of Heavy Industry in Moscow of 1934. One of the renderings Leonidov produced for this project emulates a photograph from Mendelsohn's *Amerika* of the Equitable Building in New York City – an image that Rodchenko had featured in his essay 'The Paths of Modern Photography'.

There were nevertheless critical points of difference between Rodchenko's visual theories and Leonidov's architectural project. The most important difference is evident in the way Leonidov presented his model. In the publication of his project in *SA*, he insisted that it was not merely a photograph of a model but a *foto-maket*, or photo-model, a compound device he created to communicate his concept of space. Like all models, the photo-model was produced from a variety of material objects:

eggshells for domes, moss for shrubs and so forth. But Leonidov's model was a photo-model not simply because it was photographed from several angles; on the contrary, Leonidov used this term to highlight the fact that his model incorporated photographs as material elements of its construction. Its most salient feature is the picture of a dirigible that has been pasted onto its ground. In the sequence of images of Leonidov's model, this airship figures as a double of the one the viewer implicitly occupies while gazing down at the territory of the club. But as the viewer examines the series of photographs Leonidov presented, its flattened presence causes its appearance to oscillate between recognisable figure and unintelligible form. At times this airship helps simulate the experience of aerial observation and at others it confounds any reading of the images as 'honest' views. In effect, this pasted object throws the space of Leonidov's images into crisis.

Leonidov was not the first to use photomontage to articulate architectural concepts. El Lissitzky had used the technique to stunning effect in his *Wolkenbügel* (Cloud-Iron) project for Moscow of 1924–25. Likewise, Ludwig Mies van der Rohe's Friedrichstraße skyscraper project is most compelling in its montaged forms.⁴¹ These images share a seamless quality, a sense of cohesion: the new structures, while challenging the premises of their respective environments, nevertheless conform to the spatial coordinates manifest in their surroundings. Part of what makes these images so convincing is the way that they mediate the radically new and the numbingly familiar, the way they quite literally make the new fit into the old.

Leonidov's photo-model offers something more complicated. Here, it is not a drawing that has been montaged into a photograph, but rather a photographic fragment that has been montaged into a model and then photographed. This hyper-mediation slows down our perception of the total project, requiring us to sort through nested representational frames as we make sense of Leonidov's work. The strange doubling of airships – the one we implicitly occupy and the one we see pasted onto the ground – produces an ambiguous spatial relationship. From above, in the perpendicular view, it appears plausible that this second airship might have docked. But in the oblique view it is clear that this element lacks volume and fails to conform to the perspectival conventions of foreshortening. This fragment causes the entire scene to shift between coherence and heterogeneity. Viewing this composition, we are struck by the same question that was printed in the magazine article from which Leonidov's dirigible was clipped: 'what sort of a figure is this?'⁴²

In preventing the scene from conforming to a unified, commensurate whole, Leonidov's

images are related more closely to Piranesi's construction of space than to Lissitzky's or Mies's approach to montage. As Manfredo Tafuri has compellingly argued, drawing heavily on the research of Ulya Vogt-Göknil, the spaces of Piranesi's *Prisons* series do not cohere; they fail to create a homogeneous spatial system. The columns, arches, stairs, bridges and other architectural elements of Piranesi's scenes are drawn not from a single perspectival point but from multiple. In Tafuri's words 'this breaking up, distorting, multiplying and disarranging ... is nothing more than a systematic criticism of the *concept of place*'.⁴³ The spatial heterogeneity that Tafuri discerned in Piranesi's prison scenes is also present in Leonidov's architectural project. The tension among the objects that make up Leonidov's photo-model – eggs, moss, a photograph – derives from the fact that they frustrate attempts to fit them into a single, coherent vantage point. Indeed, the simultaneity of viewpoints within the photo-model – the territory seen from above, the dirigible seen from below – destabilises, fragments and multiplies the position of the viewer.

Leonidov's abstract drawings and elaborate models would later attract the accusation of 'formalist' indulgence.⁴⁴ But his attention to the details of his photo-model and the images that make up his presentation of the 'club of a new social type' were not simply formal exercises, they were key elements of his architectural argument. For the fragmentation of vision produced by the photo-model corresponds to the spatiality of Leonidov's media: radio and television. The sites within Leonidov's 'schema of spatial-culture organisation' presuppose spatial discontinuity as a basic condition: to listen to 'life' on the radio, as Leonidov would have it, is to radically extend the space of lived experience. But this extension entails a loss of continuity between physical, measurable space and the place of reception. 'A screen that receives images by radio', to recall Samuel Weber's proposition, overcomes distance by dissolving the unity of place. In this way, Leonidov's photo-model, in its resistance to spatial coherence, serves as an analogue to the spatiality of the Soviet Union's emergent media infrastructures.

Ultimately, the model of spectatorship presented in the 'club of a new social type' offered a challenging proposition: spatial continuity is no longer – if it ever was – a fundamental condition of cultural reception. It is for this reason that Leonidov declared the apparatus of traditional theatre obsolete. It is also for this reason that he highlighted discontinuity and oscillating spatial systems in the elaboration of his project. The difficulty of Leonidov's images – the apparent opacity of his 'schema of spatial culture-organisation', the spatial inversions within his photo-model –

was certainly deliberate. Their visual difficulty demands active perceptual engagement from the viewer and ultimately defamiliarises the very act of looking. In resisting the possibility of visual coherence, by forcing us to look again and again at the spatial tension produced by the 'club of a new social type', Leonidov was seeking to educate the eye to the new, fragmentary spaces entailed by the media infrastructures that were being constructed around him. The project thus represents an attempt to document the effects of the scientific and technological progress that the club was intended to foster. In this sense, Leonidov's club was not an exploration of form, as some of his constructivist colleagues suspected, but an exploration of the fundamental conditions of cultural organisation



in a media age. In this environment the translation from the microcosm to the macrocosm, from the individual to the collective and from the building to the world seemed to require a concept of space that could not be captured by the visual paradigms handed down by the renaissance. Likewise, in such an environment an architect with Leonidov's concerns could not limit his activities to the delineation of visual forms. He made this much clear at the First Congress of Constructivist Architects:

Question: Do you think it is necessary to organise visual perception in general?

Answer: It is not a matter of organising visual perception, but of the general organisation of consciousness.⁴⁵

1. For the programme of the Congress see 'Pervyi s'ezd OSA', *Sovremennaiia arkhitektura*, no 1, 1929, p 38.
 2. Ivan Leonidov, 'Proekt kluba novogo sotsial'nogo tipa', *Sovremennaiia arkhitektura*, no 3, 1929, p 111. The transcript of the discussion of Leonidov's project was printed in this issue of SA. The text has been translated and published by the Institute for Architecture and Urban Studies. See Institute for Architecture and Urban Studies, *Ivan Leonidov* (New York: Rizzoli, 1981), p 27. All translations of this discussion in this essay are my own and differ slightly from those in the IAUS catalogue.
 3. See M Ia Ginzburg, 'Konstruktivizm kak metod laboratornoi pedagogicheskoi raboty', *Sovremennaiia arkhitektura*, no 6, 1927, pp 160-66.
 4. Ivan Leonidov, 'Proekt kluba', *op cit*.
 5. On SA see Richard Anderson, 'The Journal States its Aims: Partisanship and the Party Line in the Soviet Architectural Press', in Richard Anderson and Kristin Romberg (eds), *Architecture in Print: Design and Debate in the Soviet Union, 1919-1935: Selections from the Collection of Stephen Garmey* (New York, NY: Miriam and Ira D Wallach Art Gallery Columbia University, 2005), pp 25-36.
 6. See A Gozak, Andrei Leonidov and Catherine Cooke (eds), *Ivan Leonidov: The Complete Works* (New York, NY: Rizzoli, 1988), p 34.
 7. Ivan Leonidov's unique contribution to Soviet Constructivism is widely acknowledged, but his engagement with media technologies has not been adequately addressed in writing on his work. See PA Aleksandrov and SO Khan-Magomedov, *Ivan Leonidov* (Moscow: Stroiizdat, 1971), A Gozak, et al, *op cit*, Alessandro De Magistris and Irina Korob'ina (eds), *Ivan Leonidov, 1902-1959* (Milan: Electa, 2009).
 8. See Sheila Fitzpatrick, *The Cultural Front: Power and Culture in Revolutionary Russia* (Ithaca, NY: Cornell University Press, 1992).
 9. See M Ia Ginzburg, 'Itogi i perspektivy SA', *Sovremennaiia arkhitektura*, nos 4-5, 1927, p 116.
 10. Ivan Leonidov, 'Proekt kluba', *op cit*.
 11. *Ibid*.
 12. Ivan Leonidov's interest in architecture's relationship to perception was shared by the group of architects gathered around Nikolai Ladovskii and ASNOVA, the Association of New Architects. But ASNOVA's psycho-technical study of form was nevertheless distinct from Leonidov's exploration of the organisational effects of new media technologies on architecture. On Ladovskii's approach to the scientific study of space and perception, see Margarete Vöhringer, *Avantgarde und Psychotechnik: Wissenschaft, Kunst und Technik der Wahrnehmungsexperimente in der frühen Sowjetunion* (Göttingen: Wallsterin Verlag, 2007). See also Anatole Senkevitch, 'Aspects of Spatial Form and Perceptual Psychology in the Doctrine of the Rationalist Movement in Soviet Architecture in the 1920s', *Via 6* (1983), pp 78-115.
 13. See Friedrich A Kittler, *Gramophone, Film, Typewriter* (Stanford, CA: Stanford University Press, 1999), p 16.
 14. Werner Hegemann, 'Lenin-Ehrung: Auditorium, Glühbirne oder Luftballon?', *Wasmuths Monatshefte für Baukunst*, no 3, 1929, pp 129-32.
 15. Alison Smithson and Peter Smithson, 'The Heroic Period of Modern Architecture 1917-1937', *Architectural Design* 35 (1965).
 16. Anatole Kopp, *Ville et révolution* (Paris: Éditions Anthropos, 1967). See in particular advertisements in the journal *Espaces et Sociétés*.
 17. On Koolhaas's complex relationship to Leonidov, see Roberto Gargiani, *Rem Koolhaas/OMA: The Construction of Merveilles* (Lausanne: EPFL Press, 2008).
 18. Ivan Leonidov, 'Arkhitekturnaia kunstkamera', *Sovremennaiia arkhitektura*, no 2, 1928, pp 41-47.
 19. *Ibid*, p 42.
 20. Attributed to Gustav Klucis, 'Photomontage', in Christopher Phillips (ed), *Photography in the Modern Era: European Documents and Critical Writings, 1913-1940* (New York, NY: Metropolitan Museum of Art, 1989), pp 211-12.
 21. On Rodchenko's history posters see Leah Dickerman, 'The Propagandising of Things', in Magdalena Dabrowski, Leah Dickerman and Peter Galassi (eds), *Aleksandr Rodchenko* (New York, NY: Museum of Modern Art, 1998), pp 63-99.
 22. 'Tekushchie dela', *Novyi Lef*, no 2 (1927), p 47.
 23. Ivan Leonidov, 'Proekt kluba', *op cit*, p 105.
 24. *Ibid*, p 111.
 25. On Melnikov's club in Dulevo, see Nikolai Lukhmanov, *Arkhitektura kluba* (Moscow: Teatkinopechat', 1930).
 26. For a brief biography of Petschow, see Van Deren Coke and Diana C Du Pont, *Photography, A Facet of Modernism: Photographs from the San Francisco Museum of Modern Art* (New York, NY: Hudson Hills Press, 1986), p 181.
 27. On this debate, see 'Nashi i za-granitsa', *Sovetskoe foto*, no 4, 1928, p 176. See also Peter Galassi, 'Rodchenko and Photography's Revolution', in Magdalena Dabrowski et al, *op cit*, pp 101-37.
 28. Samuel Weber, *Massmediauras: Form, Technics, Media* (Stanford, CA: Stanford University Press, 1996), p 117.
 29. Ivan Leonidov, 'Proekt kluba', *op cit*.
 30. Dziga Vertov, in Annette Michelson (ed), *Kino-eye: The Writings of Dziga Vertov* (Berkeley, CA: University of California Press, 1984), p 41.
 31. Aleksandr Rodchenko, 'Puti sovremennoi fotografii', *Novyi Lef*, no 9, 1928, pp 31-39; Aleksandr Rodchenko, 'The Paths of Modern Photography (1928)', in Christopher Phillips (ed), *op cit*, p 262.
 32. Aleksandr Rodchenko, in Christopher Phillips, *ibid*, p 256.
 33. Hubert Damisch, *The Origin of Perspective* (Cambridge, MA: MIT Press, 1994), p 379.
 34. Hans Vredeman de Vries, *Perspective* (New York, NY: Dover Publications, 1968), plate 30.
 35. Aleksandr Rodchenko, 'Puti sovremennoi fotografii', *op cit*, p 35.
 36. Aleksandr Rodchenko, in Christopher Phillips, *op cit*, pp 261-62.
 37. Erich Mendelsohn, *Amerika: Bilderbuch eines Architekten* (Berlin: R Mosse, 1926).
- An expanded edition with additional photographs was published in 1928.
38. Sigfried Giedion, *Bauen in Frankreich, Bauen in Eisen, Bauen in Eisenbeton* (Leipzig: Klinkhardt & Biermann, 1928).
 39. Cited in Detlef Mertins, 'Walter Benjamin and the Tectonic Unconscious: Using Architecture as an Optical Instrument', *Modernity Unbound: Other Histories of Architectural Modernity* (London: Architectural Association, 2011), p 128. Benjamin's text appears in his 'Arcades Project'. See Walter Benjamin, *The Arcades Project* (Cambridge, MA: Belknap Press of Harvard University Press, 1999), pp 156, 459.
 40. See Janet Parks, *New York on the Rise: Architectural Renderings by Hughson Hawley, 1880-1931* (New York, NY: Museum of the City of New York, 1998).
 41. On Mies's use of photomontage see Martino Stierli, 'Mies Montage', *AA Files* 61 (2010), pp 54-72.
 42. 'Zagadochnyi snimok', *Sovetskoe foto*, no 12, 1928, p 570. Leonidov clipped his image of a dirigible from a popular photographic contest. Typically, the editors of *Sovetskoe foto* published an unusual image of a familiar object and asked readers to identify it. In this case, the editors published the image of a dirigible seen from directly below that Leonidov used for his photo-model.
 43. Manfredo Tafuri, "'The Wicked Architect": G B Piranesi, Heterotopia and the Voyage', *The Sphere and the Labyrinth: Avant-Gardes and Architecture from Piranesi to the 1970s* (Cambridge, MA: MIT Press, 1987), p 27. The italics are Tafuri's. See also Ulya Vogt-Göknil, *Giovanni Battista Piranesi: Carceri* (Zurich: Origo Verlag, 1958), p 36.
 44. In 1930 Leonidov was targeted by the All-Union Organisation of Proletarian Architects (VOPRA) in a campaign against so-called 'formalist excess'. The campaign came to be known as the 'Leonidovshchina'. It was initiated by Arkadii Mordvinov with an article titled 'Leonidovism and the harm it does'. See Arkadii Grigor'evich Mordvinov, 'Leonidovshchina i ee vred', *Iskusstvo v massy*, no 12, 1930, pp 12-15. The article is available in English translation in A Gozak et al, *op cit*.
 45. Ivan Leonidov, 'Proekt kluba', *op cit*.

Ivan Leonidov, c 1935
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