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Selections from
**Der Raum als
Membran**
(Space as Membrane)

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WARNING

 The rhythmic man overcomes
the constraints of the past...




There are more important things than architecture, but architecture is no less important than radios, airplanes, and color photography.

There are more fundamental problems than those of architecture, but they are no less fundamental than those, for example, of biology or Psychotherapy.

In this treatise, I attempt to expand by certain leaps the idea of architecture by partially tracing it back to its elements. This is not about solutions, but about directions; this is not about methods (Wege), but about values (Werte).

This treatise remains an appeal, not a report of any kind. Perhaps, only after many years, the first report on the line of the newly perceived problems will appear before the public produced by a progressive research or living community of some sort working in the field of residential construction research in an objective manner of execution. What difference do twenty years make measured against the immense task? There will be generations, who will step over the pioneers of thought like overstuffed dummies. So what? If one wants to dance on ropes, one must pull some ropes.


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I. FOUNDATION

1. To have a scale with which we can measure the existing architecture or the architecture that will interact with the future it is useful to envisage the primordial condition of residential construction as the basic form of architecture. We would like to characterize it more or less as such:

In the midst of a dream-like changeable world of things, a house is a relatively rigid multi-cellular hollow spatial entity (*Hohlraumkörper*), whose underside is fixed or loosely connected to the ground of the earth traversed by manifold forces. With its remaining sides, the house is adjoined to a thinner medium, which is penetrated with rays of light of a varying quality that periodically alternate. The friction of the hollow space that results from the two pairs of forces enters into a **regular** interaction with living organisms in their psychical and physiological definition. The degree of harmonious balance between these three components decides the character and quality of architecture.

If we then look at the existing residential constructions, we must come to the following conclusion: innumerable measurable (or not yet measurable) minute flows stemming from the breathing earth or the radiating space of the sky bounce off the walls of our houses unused (assessed only by physiomechanics), or are **neutralized** in their cavities. The consequence is that the so-called “breathing” of the wall skin (*Wandhaut*) made of wood, mud, stone or substitutes can indeed regulate the crudest relationships between the artificial climate of our living quarters and the natural climate, but it cannot, for example, prevent the organism from continuing to be exposed to the subtler fluctuations in intensity of air radiation (particularly before thunder storms, during snowstorms, Foehn or Sirocco [sic]!) to the detriment of the organism’s psychical mobility. This does not just apply to particularly sensitive human beings, but is also noticeable at least in the form of a dull discomfort among more robust natures. One of the first researchers who anticipated this problem in its proper significance and scale is the Heidelberg professor Hellpach. His main oeuvre is already a fundamental and simultaneously enlightening work.² He was one of the first to underscore the

problem of supplying light through our windows with the information that the material commonly used in glass windows (soda lime silicate) absorbs specifically those ultraviolet rays that are essential for the human organism. This means that the solution of the problem does not depend on the clear span of the window opening and certainly not on its form, but on the material structure of the light filter we use, the way that the latter is explained by science. (This is the task of photochemistry and physical optics in collaboration with physiology etc). This is only the first example of the primitive line along which our residential construction still moves. The earth-cave and the fortress are the characters associated with this primitive origin; these characters still remain attached to residential construction even where the latter no longer has anything to do with the former in terms of form and function.

The more we reveal the material connections of nature, and the more we feel the need to make our cities true urban landscapes (*Stadtlandschaften*), that is nature formed by the intellect, the more obvious it gets, that as much as it is possible the character of the skin (membrane) between exterior space and the dimensions of the body is essentially the same with the manner in which one sets dimensions in the space as such and to the way in which one defines it in a physio-psychical level (e. g. through color).

Architecture is no longer supposed to be placed in an immediate relationship to humanity as such, as was the case in the past, but to this human being of flesh and blood who is in full possession of an infinitely increasing sensuality. However, this reorientation of our sense of order also means a reevaluation of architecture. Space is no longer perceived as a positive agency that impresses the human being who lives inside it exposed to its tensions in a specific psychical manner, as an entity with which she or he must deal mentally or experientially in some way or another. Rather space should be perceived more as a *negative*, something that only creates the physiological preconditions, under which the individual based on his psychical structure can develop completely autonomously and free from all foreign suggestions in order to expand as a discrete “being-for-oneself”—a microcosm.

2. The following image describes the current situation based on the entire arrangement of today's house or rather based on the types of materials used in walls, ceilings, etc. Heating, artificial lighting, ventilation and medical radiation require more or less complicated construction components that are set up, mounted and installed as apparatuses independent of each other (compare to the inner unity of radiation present in open space!) The latter are independent of the "idea" that the architect tried to express in his [conception of] the living cube (*Wohnkubus*). Certainly the newer inventions of the television and the telephone have no inner connection with this idea. This leads to a strange contradiction that the more sensitive spirits have felt as such for a long time: The [new technical] apparatuses stand as clearly visible exponents³ of the *Zeitgeist* and its developmental tendency; they stand as technical "wonders" in a divergent uninterested interior world space, which remains the same regardless if it has the stylistic character of a historical period or if it has been neutrally cleansed from historical remnants. Apart from momentary visual impressions, architectural space—whether it is classically clean, baroquely ornate, or hyperdynamic – offers without exception to the psychological experience of modern man only the import of a stale, insignificant orbital mass (*Schalenmasse*)⁴ that surrounds symbolic nuclei of much finer relationships in various levels between human being and human being, human being and matter, human being and the world spirit. There is an oddly oscillating new dimension that literally radiates in our direction from subtle heating elements, radio switches, sunlamps, etc. acting as materialized witnesses of this radiation projecting like a torso into a much more indifferent spatial enclosure.⁵

The consequence of these factors is this unfortunate division: here architecture, here technology, here art, and surely in most cases architecture ranks last.

In order to bring everything in order, it would be logically consistent to reevaluate space as an entity based on the spirit of the new apparatuses, by demanding that the complicated parallel or crossing trajectories [*Neben und Durcheinander*] of functional devices should be reduced as much as possible to the ultimate

simplicity of an integrated existence (*Ineinander*) that relates all parts with one another and adjusts automatically to exterior space.

This means nothing less than the fact that the house should be understood and designed as its own energy source. This is not impossible; the house offers much too large an exposed surface for the forces of the ground (particularly through chemical decomposition) as well as for the forces of radiation emanating from open space (*Freiraumstrahlung*); and one should not forget the rising of this energy potential, if research conditions are properly arranged.⁶

3. A large airplane is a luxury for Europe, for Eurasia however a necessity; injections against sleep illness are a scientific pastime here, in the tropics however they are a requirement, etc. The tropics and the arctic regions, these broad stretches of earth supplied with radiation caused by the abnormal temperature, present us with new challenges. Not only, because they could very soon become important geo-politically for our own vibrant economic development, but also purely as a geo-social act. Whoever may be unaware what tropical climate and polar winter mean even for the natives not just for the settlers, should read the reports of our anthropologists or the book cited earlier by Hellpach. Millions of human beings are exposed to this terrible climate caused by the earth factor, when it is possible with scientific means, if not to completely eradicate this factor at least to diminish it; [neglecting this] would not simply mean an excusable oversight, but a folly and a narrowness in our understanding of the fundamental conditions of our intellectual existence ("what is it to us?"). Our currently dominant form of individual psychology however could not yet see any parallel other than the influences of environment (*Milieu*) and heredity. However, a psychology based on the principle of symbiosis and the parapsychical relationships of the living environment knows very well, that e.g. the dull lethargy of an Eskimo in polar winter can just as well affect human beings in our environment, in the context of our [atmo]spherical constitution.⁷ Therefore, humanity acts in the interest of the elevation of the human being if it takes up the principle part in the battle against the dangers of not only a single environment but also against

all environmental space considering the parapsychical interlacing that exists among earthly beings (This is the nations' most immediate natural obligation as part of a complex system of the earth organism!). In general, since mutual acceptance and support have been deemed necessary, this position is already the constitutive motive of current international research.

Thus it is not so odd to put forward the problem of the house for the tropics, where the preconditions for a successful result are given, that is from the European soil itself. (Such an endeavor would be useful aside from the purely economic motives of an export necessary for us.)

Even in this broad framework, the climatological differentiation of architecture signals a new territory for continental architecture. In more narrow terms however, following the manner of building determined by climatic and landscape considerations that adheres to a new concept of nature, the climatological differentiation of architecture signifies that a space-cube (*Raumkubus*) set on a sandy plane under a particular sky as the activating factor of the corresponding spatial tension must be and could be made differently from a cube set on granite or in the ocean: because each time the ground forces are fundamentally different in a geo-physical sense; each time the conditions of air radiation, etc. are fundamentally different, in terms of the human organism that sets a dialog with these conditions in a physiological level.

4. These and other considerations, some of them practical, some of them sociological, finally lead to the conception of the idea of "biological architecture"; here the essential fact is that [our] time is mentally ripe for the methodic attempt to compare three-dimensional space crudely defined as such by physics to a three-dimensional biologically defined membrane that exists between our body as a plasmatic weak substance and the latent or intangible bio-structural minute forces of the spheres. This task goes beyond all simple civilizing sociological factors from 1. to 3., because its performance does not simply aim at the human being as a useful link in a power-chain that has to be preserved (see,

"state")—the latter has been the underlying thought of all so-called hygienic architecture—instead it tries to draw the spiritual in man by raising the body by several orders of magnitude. In this sense, negative space becomes the preliminary state of the activation of space. The more we try to keep this space away from our body, as a psychical environment defining our mind, the more it will become precisely a function of the "psychical" world that expands inside us. This is the paradoxical turn towards biological architecture.

In conclusion we could say: Up until now "building" was a **defense** against the coarsest fluctuations in weather, climate, human inadequacy <theft, destructiveness, envy>. "Building" was housing or the permanent representation of power in any form whatsoever (castle, temple, palace, public authority, office, villa). "Building" was the projection of our inner life to the outside, a symbolically linked representation, a sensually tangible spatial image (*Raumbild*) in a three-dimensionally layered surface. Essentially "building" was analogically connected to the anorganic realm of nature and its main representative, the crystal. Man used it by taking over its inner laws in order to shape spatial tension in a constructive manner.

In biological architecture, the term "building" loses the fundamental character of a transparent-negative function; instead architecture is now supported by a psychically indifferent, non-symbolic function lacking in pathos. Space no longer can be experienced, even though in terms of tone (i.e. beyond the understanding of our senses), it stands in a more effective relationship to our sensuousness. Spatial radiation no longer condenses to turn into imagery or psychical numbness; it remains beneath the threshold of consciousness. It is entirely effect [*Wirkung*]. The living plant becomes the new primal symbol of architecture. When Goethe writes in his introduction to "The Metamorphosis of Plants": "Everything, that should appear [*wirken*] alive must be enveloped. Thus everything that is turned on the outside, decays early on bit by bit—these are the shells given to non-life (*Unleben*), beneath which life produces its creating tissues either on the surface or in a deeper level"; corresponding to the thesis we

have already stated above, this means that we should not press a seal of eternity on architecture. Monumentality and representation by means of mass effect or mass coupling should be far from it. Style should be embodied in our body and in the way in which we lift the physical into the mental. The essential is the human being: The object (and that includes everything related to architecture) is subordinate to it. To imprint our lifestyle on objects with modern slogans such as “Will to design” (*Wille zur Gestaltung*) or “Constructivism” would belong to past eras. Everything what architecture can and should do, does not go beyond the principle of the bark [*Rinde*], or looking from the nucleus of a cell, beyond the principle of the membrane.

A

II. CRITIQUE OF CONTEMPORARY APPROACHES

1. Let us look around us! Whatever has a leading role among the new spatial creations due to the new materials, such as iron, concrete and glass that are still defined in a physical-static way, is a translation of the delicate constructions of our great architectural forefathers into a robust form of rationality, as well as a crossover of principles that have a clear and sensible value in industrial technology. Using a new material in the same basic frame, altering the circumstances, appropriating the measurements, all these do not yet signify a leap, no internal draw towards the primal zone of the design process [*Gestaltung*]. At best it is a fond symbiosis with the great mother of “Technology” or a proof for a certain “*Qui vive*” on the basis of a society, for which “money and being human” are equivalent. Hardly a sign of the evolution of the primal spirit (*Urgeist*), that in a revolutionary, dynamic way reaches deep into the ultimate relationships between man and the world! All the more “metaphysical” pathos! At some point in the future, one will pass over all this while keeping silent, at least the ones who did not ignore the strongest suggestion exerted by the dying civilization, that is the demon of capitalism; while on the other hand they would have

had the duty to place higher tasks upon themselves, performed with in top mentality and they would have to set up new criteria for “creation”.

2. There are no attempts towards a future groundbreaking architecture even in those cases, where roofs are flat, planes project, windows are pushed to the corners, spatial bodies become cubic or are being cubically dissolved, i. e. modeled with the temperament of a sculptor. Everything [is] still plastic, but not [really] plasmatic; everything is still formal or rather once again merely formal, [but] not substantial. One emphasizes with bold strokes the will to a new architecture, without filling this will with new meaning. One emphasizes figure (*Gestalt*), not content (*Gehalt*). One peers at the engineer, but even in the “most sober objectivity” (*Sachlichkeit*) one remains an aesthete. One wants a universal style (with mathematical coldness), yet what he really means is the disintegration of intellectual powers that are uncomfortable to him flowing from other sources [25] with other speeds and pressing for other valleys.

[...]

4. No groundbreaking attempt is therefore also to be seen in our typical modes of housing-settlement, as harsh as it may sound. Settlement’s bed of Procrustes became architecture’s winter- and deathbed. More architects are suffering from this tragedy than the public that is influenced by politics wants to acknowledge. “To each man his own home” became “To each man his own home with minimum means”. Thus politics destroyed the spiritual value of architecture.

Only a few, favored by personal circumstances, took the more remote path and considered the problem of housing shortage in such broad terms that its solutions would have been able to continue existing in the face of posterity.⁹

5. No [groundbreaking] attempt is furthermore [represented by] the problem of the “machine for living” (*Wohnmaschine*). Supported by the economic conditions and the uncertain biological shifts in the basic substance of our nation’s

life, the idea imported from America of the standardized house (*typisiertes Siedlungshaus*) correctly installed for **living** functions by a business hand would become the big slogan of the time. But apart from its business-like, one-dimensional economic consequences, what would the American method of fabrication have had in common with a German idea of architecture? If we were to need the quickest means of construction for times of migration and mass displacement, then it should not be so difficult to find a flat house type with a normal space that would go to the most extreme limits of rationalization.¹⁰ The heart of the problem however would remain: Even if the more rational stop-watch-system of producing an object, including a house, is connected to the term of the machine, the machine primarily has a much more distinguishing character trait. The essence of the machine is **increasing** performance, **converting** energy, e.g. from coal to electricity, to Horse Power, or from wind pressure to the movement of masses: This is the idea of the machine. If one really wants to relate architecture to the machine, then this can only occur in the depth of the idea of a machine.

B

APPROACHES

1. Small real, positive attempts and signs of a fundamental change of direction in the architectural idea we see however, for example, in the attempt of a Japanese bacteriologist in Yokohama. This scholar has erected a glass house on a shadeless plot of the hospital in Yokohama, in which the individual glass blocks are filled with a saline solution that absorbs the heat of the sun.¹¹ In this scientific and yet primitive manner, the rooms that are otherwise light-flooded and not screened could be kept cooler than other rooms shaded by curtains or blinds. Because during the evening the saline solution re-emits the solar heat

it has gained during the day, the rooms also have a consistent temperature during the night that is noticeably cooler. One should note in this connection the fitting book by Raoul Francé “Technical Accomplishments of Plants (*Technische Leistungen der Pflanze*)” that will attract greater attention from the architectural science of the future.

2. Attempts were to be seen in the most fervently passionate novelistic architectural tracts and hymns of Bruno Taut and others. However the representative-cosmic-religious element within these novels was too much *Sturm und Drang*. Like all ecstasies, it too did not go deep enough and did not grasp the problems at the right points or decisively enough. The wonderful hymns such as, *Alpine Architecture* or *City-Crown (Stadtkrone)* are and remain an ingenious prelude to the new, a glorious prelude that will always inspire as an everlasting document of a great first beat (*Vortakt*). However they suggest no ground plan for the preparatory work (*Vorarbeit*), as Bruno Taut himself later proposed in his work “The woman as creator—(*Die Frau als Schöpferin*)—and the manner that we believe to have supported him.

For the architect of the present, the difficulty for active participation in such a change lies in the fact that while in the area of monumental construction, confident new inner presuppositions seem indeed to be forming, in the case of residential construction, the same narrow limited and narrow-minded conditions basically exist everywhere as they did thousands of years ago. The difference here perhaps is that the demands of the individual for comfort concerning the function of “inhabitation (*Wohnen*)” have developed or rather have been democratized. However in all other instances, a unified, strongly vocal **spiritual** attitude is precisely missing—an attitude that could act as a style-forming force.

One can see that the biggest task of the next century is first cultivating a new human type where *constructeur* and artist meet, a person who is discerning and striving to a new evaluation of himself and of his connections to the mystery of the world which he radiates outwards. The entire Gothic and its pre-stage are a

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single **Form**-becoming-process of the spiritual core of crystallization. Even the simplest situations in that life-process were deep enough, to be able to become a tremendous pictorial symbolism grasped spatially. Therefore all architecture, which bases itself on a mode of naked functionality and aims solely for this in an *intellectualistic* way, will collapse together with that form of life that appears to be supporting it today.

III. THE NEXT TASKS

This treatise would remain incomplete, if we did not specify the next requirements in architectural research. Therefore as an addendum, we include an overview that will briefly characterize the problems that should soon be addressed, and whose solving is warranted by a concentric approach between science and industry. One of the prerequisites is the deliberate temporary abstaining from the usual tested and therefore more comfortable solutions of heating, lighting, and ventilating a house. A prerequisite is furthermore an attempt to lead the entire problem of the house back to elementary conditions that are more and more clearly thought through and precisely formulated. A further prerequisite is that the research at first keeps itself completely free of considering the public opinion. If for instance it were shown (and everything seems to point in this direction), that the windowless blind house as an absolutely black body (in terms of physics) remains the ideal for heating economy, then this would create the fact that another solution is required for the questions of lighting and ventilation. Perhaps this would immediately show that the more natural and useful revolutions are the radical ones (those that return to the roots). What at first looks like a complication of the problem of the house, basically means a return to the elements and contains inside it the hope of finding a new terrain. With this conviction we encourage the following:

1. It remains to be studied, to which extent a difference in the energy potential

of the house could be achieved by utilizing the natural forces of the ground (chemical-physical) and the forces of radiation present in open space (*Freiraumstrahlung*)—specifically those, which become reactive under the influence of light. This difference in potential could be transformed into valuable energy by means of a circuit of resistors. As far as we know no research has been conducted to test a lit and an unlit reaction system in terms of energy exchange in the electric field. If this were to occur systematically for all conditions of ground- and air-radiation on earth and if it were successful, then it would not be unthinkable that by these means we would reach a climatologically differentiated architecture.

2. The form in which we supply light into a building today¹⁵ in its connection with the question of ventilation limits the possible **depth** of the building. From the economic point of view this is the largest disadvantage of the organizational orientation of buildings according to sides, other than that the migrating light breaks the interior spaces into irregular zones of light and shadow (something that is, for example, avoided by means of the indirect artificial lighting of space in the evenings). Up until now, wherever rooms without direct light supply were wedged into a building, one was able to help himself with a skylight or with artificial light. In a building with multiple stories the option of the skylight ceases to exist and artificial light is only an expensive and very relative substitute for natural daylight. In this case, the task is to concentrate the light source in a suitable equipment on the roof and to lead it from there to the individual rooms of the floors either by a system of pipes or something similar (fluid light). The equipment on the roof would have the advantage of capturing the sunlight under the best angle of incidence for the longest period of time and of being the best plane of entry for the diffuse light of the firmament. The development of our large cities would then be able to go from an edge-building condition to a block-building condition without being reliant on using artificial “daylight” exclusively. Solving the problem however seems to be even more important to us for the house in landscapes that have abnormal heat radiation, as for example in hot countries, where it is desirable to construct the enveloping walls as uninterrupted skin and to direct the filtered stream of light into the house cube by other means.

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3. Natural light should blend with the artificial light of the house—“machine” (by means of a current that is either delivered or self-generated) to such an intimate unity of arrangement, so that the quality of light is regulated automatically (avoiding twilight, dawn and grayish light on dreary days, specifically in the Sub- Arctic).

4. It is possible that the planar, quasi-pictorial application of color on walls and ceilings will disappear at the rate in which the systematically attuned exchange of radiation between the light source of the interior space and the covering material of the wall or the ceiling will produce its own iridescent or other reflective appearances on each surface. Wherever light is spectrally refracted by suitable filters into prismatic bodies, the overlaying of these bodies produces colored shadows. This method can be systematically expanded to a quasi dematerialized artistic medium [*Gestaltungsmittel*] that **corresponds** more to the nature of “color” and light and informs the actuality [*Gegenständlichkeit*] of a space.

5. Roof, ceiling, and floors are to be connected to the electrical circuit of the walls so as to achieve the intensification of spatial radiation. The choice of building material should be oriented exclusively according to the **dynamic** function of the entire facility. Gradually, this has to become the shared object of investigation of biology and physiology on the one hand, and physics and chemistry on the other. The time is coming, in which the rough or perhaps the roughest of all crafts, i. e. architecture, becomes one of the most subtle and most noble of them—an area, in which all sciences (and this does not mean merely “applied” sciences) congregate.

6. Metal is to be used only in the degree that with it we can attain utilizable currents. Wherever this occurs, the use of metal (even of the more valuable metals, such as zinc, copper, platinum) is justified and required.³³ The same is true for other materials.

7. The proportions of a space, the materials of a wall, air pressure and air composition, temperature and degree of luminosity are values dependent on each other, whose common denominator is “radiation”. However, additively measured they would not yet result in what the organism experiences as spatial tension (in terms of tones, absorbed by the senses). A systematic progressive research should be set up in order to construct an apparatus, with which it would be possible to measure any space whatsoever for the radiation of its interior space (this includes light and acoustic ratios as well as spatial proportions) and by taking an optimum value as the example, to create comparative values.

On the whole it should be stressed that the house should be perceived as a conducting medium (*Durchgangsmedium*) channeling a stream of forces that is continuous, even if it gets refracted several times in its trajectory; the same stream flows from a ground surface that in geophysical terms is variously defined, through a hollow space to an open space that is also variously defined, and in the reverse direction. In each case, organisms subjected to physiological **and** psychological laws stand in the center of this play of forces.

NOTES

1. *Translator's note: Föhn: warm, dry katabatic wind blowing from the Alps, often said to cause migraines and general malaise. Scirocco: warm wind in the Mediterranean blowing from the Sahara, often carrying sand and dust particles.*

2. Here one may quote from Willy Hellpach, "Geopsychical phenomena (*Geophysische Erscheinungen*)", 3rd edition 1923:

1. The organism is a piece of the electrostatic field of the earth and as such, it continuously partakes in the balancing of influence between the field of the earth and the field of air. In some human beings this goes as far as perceivable discharges (glimmering, sparks). These psychophysical effects are considerable, regardless if they are subjectively felt or not, but there are no scientific proofs yet.

2. There are human beings whose psychophysical condition is affected by the earth's composition (ore, coal, water, rock) but of which they have no immediate knowledge or sense of perception.

3. *Translator's note: Possibly: Exponat in the original rather than Exponent: exhibition piece rather than exponent.*

4. *Translator's note: Schalenmasse in the original text. Schale probably refers to Niels Bohr's atomic model, known in German as the Schalenmodell.*

5. It is not uninteresting, that particularly when human beings come together to celebrate, the building spaces are lit up with artificial light even during the day, in order to achieve a greater optical tension in the space through mirroring reflections in dishes, metal, faces; and [on the other hand it is equally interesting that the same building spaces] are muted during times of sorrow, in order to cancel out (or sublimate) the indifference of daylight.

6. Up until today the flue tube (as in a chimney) is the only device in the house, which transforms the physical conditions of exterior space into an **immediate** dynamic function of the house-organism.

The lighting rod, i.e. a type of input and collector of atmospheric electricity, also manifests a similar immediate relationship [with the environment in terms of energy collection], however its effect might be positive in the case of thunderstorm, while during the rest of the time it is completely negative.

Lighting rod and smoke stack however both are **rough** preliminary states of elements in the house as machine, as we think of it . . .

7. *Translator's note: Sphaerisch in the original but possibly meant as atmosphaerisch.*

8. Occasional building techniques and building materials that have been shown to be very practical for landscapes overseas with other climate, other traffic conditions etc., such as for example, the aluminum rubber roof cover, the thermos wall or the easily mounted Junkers corrugated metal roof construction (*Junkers-Lamellendachkonstruktion*) can not yet be considered a systematic treatment of the matter.

[Translator's note: Junkers: German airplane manufacturer (~1915-1945). Many Junkers aircrafts, including the Ju52, had a corrugated metal fuselage. On the relation between the Junker's aircraft factory, the Bauhaus and Siegfried Ebeling, see, Walter Scheiffle: bauhaus, junkers, sozialdemokratie. ein kraftfeld der moderne, Berlin: form+zweck 2003.]

9. In these I include the circular high-rise project of the architect Peter Thimister, Berlin, that stayed away

from all things Chinese; the project was supposed to create a modern home for 24000 human beings with careful gradations in terms of family size on a very small area of development (diameter: 650m); in its effect of urban development, [this project] would have carried the great sign of the architecture of a missing era.

10. Something like the [construction] type [for example], suggested by the author, of mounting the entire bearing structure in the factory and then due to the special profiles of its floor and ceiling beams that can nest in each other, the structure with all its other parts can roll on two low-riding train- or truck-carriages [and move] to the place where it will be erected; there it is pushed onto the prepared foundation, pulled open and [then it is] finished.

11. Particularly the ultra-red part of the spectrum.

12. Compare the fundamental writings of M. Luckisch U.S.A in "Light and Labor" (*Licht und Arbeit*). Verlag Springer 1926, the intuitive inventions of the Russian Malewitsch [sic] on "Blind Architecture", the symptomatic efforts of the Osram-Society etc.

13. Metal houses in the manner of the English (dating since 1923) signify a waste based on the malfunctioning configuration of metal occasioned by the unfounded parallel between ship building, car manufacturing and housing construction; even if this trend has some following in Germany, it will reach a dead-end. On this issue, compare also: "The Problem of Steel Houses (*Das Stahlhausproblem*)"; critical essay by engineer Paulssen, in the *Deutsche Bauzeitung*, 1926.