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Hardly any other area of the built environment has had such a paradoxical existence as the field of infrastructure. While few other means have inscribed themselves so deeply into architecture, becoming part of our daily lives and vocabulary, infrastructure remains, in effect, an invisible presence. It's only when the system breaks down, or the connection is lost, that we become aware of it, and then usually in a negative sense. This lack of awareness seems all the more surprising given that over the last 200 years infrastructure has widely undermined the traditional conception of architecture as an enclosed space.

Indeed, the far-reaching transformation of architecture in the recent past is less the result of formal innovations such as the international style or postmodernism than a new set of fields of expertise (for instance, in hygiene), processes (for instance, in electrification or access to water), and agents (such as building, machine, or sanitation engineers) that allow the regulation of the environment, or the surroundings of buildings, through a series of new apparatuses, devices, or appliances. This expertise would bring with it a comprehensive reorganization of architecture and urban planning, and large-scale reallocations among the various practitioners. These changes, which are in the broadest

sense political, have generally been linked to the development of infrastructure.

But how have these new practices changed our relationship to space? In what ways have they altered our understanding of architecture? Lastly, and most fundamentally, what does infrastructure mean in relation to architecture?

1. Infrastructure is a modern neologism. It originated with the French railways in the late nineteenth century to describe the earthworks necessary for the laying of rail tracks. Only in the postwar years did its definition expand to take in airports, oil pipelines, fuel storage tanks, and various communications and air defense systems, before it finally acquired its current social and economic meaning. With this final expansion of meaning, the term belatedly—only very recently—entered architecture, implying at the same time a division between a superstructure and an infrastructure.

2. In architecture, infrastructure does not refer to the substructure that carries a superstructure—that would be a foundation—but rather to those technical systems that are designed to optimize the use of the space and make it permeable to people, goods, media, and energy. Infrastructure does therefore not support a building, but rather its use and ever-changing conditions in time.

3. Infrastructure refers to requirements that are linked to the performance of architecture. In the first instance, this means only the individual pieces of equipment that provide for the smooth running of a building, such as the heating or ventilation systems that enhance comfort, the telephone lines that improve communication, or the water supply that ensures sanitation. These requirements have led not only to a precise regulation of the various flows (of water, electricity, people) into and out of the house, but also,



increasingly, to a programming of the space itself—the bathroom, kitchen, laundry room, etc. Infrastructure is thus not only a physical component or a system, but both at once.

4. What characterizes the technical object is the close monitoring of its efficiency—its many infrastructural operations (heating, cooling, ventilation, communications) all being subject to constant evaluation and optimization. Therefore, what characterizes infrastructure is the fact that the various functions of architecture—insulating, load bearing, moving, circulating, etc.—are laid out in such a manner as to render the different dimensions of existence explicit. Correspondingly, it is possible to conceive these functions individually, but also to give them form, or alter, improve on, or reject them.

5. This transformation far more comprehensively reflects the modernist attempt to objectivize the means and instruments of architecture by differentiations: between served and servant spaces, between load-bearing and supported elements, between ornament and structure, or indeed between infrastructure and architecture. This division finds its expression, bureaucratically, in the proliferation of safety, energy, and fire regulations and norms, but also in the increasing specialization of architectural education.

6. To speak about infrastructure therefore implies making a fundamental distinction between different types of elements within a building. In this process, the design of infrastructure, with its sophisticated technologies, is often separated from the realm of architectural design, since it is thought to concern only isolated, specific functions of architecture, for which responsibility can only be delegated to a specialist in that field.

7. But in reality the opposite is true. Technology does not only concern specific, isolated aspects of architecture to which particular functions can be assigned, in the manner of household appliances or kitchen and bathroom fittings. Technology, in its broadest sense, is—and always has been—also the precondition of architecture. From this perspective, infrastructure is no longer to be seen as a product of modernity's civilizing march, but rather must be understood in a much broader cultural and historical context, as a technology or tool used to provide for human needs or alleviate scarcities.

8. In its etymological sense, technology means artistry. It denotes the capacity, using the means of a given time and place, to not only find a concrete solution for a problem, but also to give it a meaning. In this way it helps to reassert, as shared experience, the aesthetic dimension of life. For what technology is doing is not only representing a new reality, but helping us to decipher that reality.