*Alban Janson*

# Porosity —
# Ambiguous Figure and Cloud

There is a lot of talk of "porosity" at the moment, for example, the "porous city": whether it is Rio de Janeiro, Beirut, Taipei, or Paris, porosity is usually understood in the sense of various kinds of permeability in general but also metaphorically. In the present essay, however, I wish to address porosity in a very elemental, concrete, material sense, which I believe represents a fundamental architectural phenomenon.[1]

Distinguishing between inside and outside is commonly regarded as the essential distinction in architecture. That is, in any case, how the system theorist Dirk Baecker defines it: "it is architecture if you can go in and come back out again, and when the relationships change with this going-in-and-coming-back-out."[2] What I would like to show, by contrast, is that another basic distinction is at least as fundamental for architecture, even if it tends to be underrated: the difference of filled and hollow, of mass and void, of volume and space. We gain our experiences with architectural space in the interaction between bodily elements and spatial figures or between spatial form and physical form. In what follows, I would like to consider this interaction, the complementarity and continuity or, if you will, mixture of filled and hollow, of mass and void, of volume and space from the standpoint of porosity.

Porosity—that is to say, the manifold integration of hollow spaces into physical mass—gives us a specific experience when translated to the scale of architecture. Porosity in architecture does not limit our spatial latitude with a solid boundary but rather gives us the feeling that we can follow the infiltrating gaze in order to penetrate different forms and depths spatially as well.

I would like to approach the question of what that could mean in detail for architecture along two different paths: first, the path of oversimplification, the keyword for which is "figure-ground illusion," and, second, the path of refinement or analysis, for which the keyword is "cloud."[3]

## Ambiguous Figure

Let's begin with the scale of a single building and its immediate vicinity. In his *Handbuch der Architektur* of 1926, Fritz Schumacher, the municipal architect of Hamburg pointed out,

**1** "Porosity" can be regarded as a fundamental concept of architecture. Janson, Tigges 2013 and Wolfrum, Janson 2016.

**2** Baecker 1990: 83.

**3** The phenomena addressed here were discussed using these two concepts in the interdisciplinary symposium "Das Architektonische der Architektur" at the Karlsruher Institut für Technologie in 2013. See Soeder, Schmitz-Hübsch, Janson 2015.

**4** Schumacher 1926: 27f.

"that architectonic corporeality is a *doubled* producer of space. This physical manifestation functions as a demarcation of space in two ways: namely, of the *interior* space and of the *exterior* space. [...] In the interior, the physical shell of the building represents the entire spatial termination; in the exterior, it is, as a rule, just one element of this termination, which is only completed by other elements of architectural or scenic character. [...] Thus when characterizing the essence of architecture we have to be aware that it is about designing subordinated spaces by means of designing the solid volumes in relation to superordinated spaces."[4]

According to Schumacher, therefore, the "essence of architecture" is based not necessarily on a mixture but certainly on an interweaving of solid volume and space. "In the brief form of a definition of terms," he thus formulated it as follows: "Architecture is the art of *doubled* design of space by means of designing solid volumes."[5]

**5** Ibid.: 28.

The relationship of object and space, of full and empty, was discussed extensively in *Collage City* by Colin Rowe and Fred Koetter in their comparison of the traditional city and the modern city: "the one an accumulation of voids in largely structureless mass, the other an accumulation of masses in largely unmanipulated void; and, in both cases, the fundamental ground promotes an entirely different category of figure — in the one *space*, in the other *object*."[6] For the authors of *Collage City*, the advantage of the traditional city is that it forms "*the continuous structural fabric or texture* giving energy to its reciprocal condition, the shaped space."[7] But they believe that "the situation to be hoped for should be recognized as one in which both buildings *and* spaces exist in an equality of sustained debate."[8]

**6** Rowe, Koetter 1984: 88.

**7** Ibid.: 89.

**8** Ibid.: 119.

This debate is based on an ambiguity that the book illustrates by citing Edgar Rubin's figure-ground illusion. In this ambiguous figure, black and white areas interweave in such a way that the decision on what is figure and what is ground becomes uncertain, depending on whether it is interpreted as a vase or as two faces in profile. In fact, every porous shape raises the question: Is it a mass with holes in it or holes with a mass around them?

The figure-ground ambiguity of architectural masses and (urban) spaces, which in the graphic design of a figure-ground plan is represented by black and white areas, should be imagined as a kind of opposed relationship "in which victory consists in each component emerging undefeated [...]. It is a condition of alerted equilibrium which is envisaged."[9]

**9** Ibid.

But can an interweaving (or mixture) of full and hollow go so far as that a building is both object  and space and fluctuates  between the two, suddenly turning from the one to the other? The architect Peter Eisenman refers to Plato's dialogue *Timaeus*, in which that which is called *chora* in Greek is de-scribed as a premorphous force that, still undecided between solid and space, helps both become reality. To make it concrete, he proposed the form of a physical angled element, in his words "something between place and object, between container and contained." He employed this element in a design

project and said of it: "It breaks the notion of figure/frame, because it is figure and frame simultaneously. [...] [T]he material of this house [is] unlike a traditional structure of outside and inside, neither contains nor is contained."[10]

If we move from the scale of the house to the scale of the city, we find the interweaving of enclosing and being enclosed when we take into account the fact that the mass (in the black of the figure-ground plan) contains in turn interiors, as the map of Rome by Giambattista Nolli from 1748 shows. The "*the continuous structural fabric or texture* giving energy to its reciprocal condition, the shaped space", mentioned in *Collage City* can be regarded as a "habitable *poché* ", as they call it. This ambiguous assignment of black and white in Nolli's map corresponds to the fundamental possibility of locating oneself in a position that is at once surrounded by mass and lies inside of mass.

We thus encounter once again the phenomenon of the dovetailing of spaces within architectural volumes and spaces between architectural volumes: the "doubled design of space by means of designing solid volumes". However, we experience this intertwining of architectural mass and space concretely in a kind of sudden switching between the two that we have to seek not in a graphic figure-ground illusion, such as the image of the vase, but in an architectural form of reversal.

This process of architectural switching was described by Fritz Schumacher. The crucial thing is that it is not about merely visual perception or considering form; instead, we perceive this process as a living situation, just as architecture is never solely about objects and forms but always about constellations of entire situations. And thus Schumacher too writes: "We explore the organic structure of space not only with our eyes, which breaks it down into images, but also by moving our physicality. By doing so we are living in the organism; we become part of it, so to speak. They are doubled sensory impressions we experience, an enriching connection that in this form is unique to architecture."[11]

Here he describes the movement in detail, such as circulation on a public square, which as a concave figure is framed by several architectural volumes (fig. 1). The individual architectural body can, by contrast, be walked around as a convex figure, while inside the building one is ultimately moving in the concave space again. Where the architectural body is part of the wall of the square, however, both processes coincide, and the concave effect and the convex effect can switch from one to the other, and one form of movement into another.

This switching can be illustrated using a concrete example:[12] When we walk around a building that is inserted into the perimeter architecture of a public square and hence primarily involved in the production of public space, it breaks free of the contour and becomes an identifiable architectural volume (fig. 2–7, with reference to the building in the center of the model). Seen from the square, the building is at first entirely subordinated within the wall of the square and participates in the contour of the square (fig. 2). As a result, the square, as a concave spatial figure, has priority over the building masses that form its background. When architectural volumes form the concave

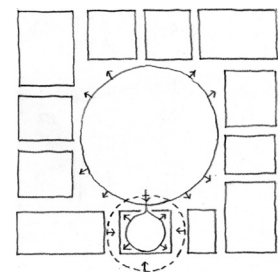**10** Eisenman 1989: n.p.

**11** Schumacher 1926: 30.



**Fig. 1** Concavity and Convexity (after Fritz Schumacher)

**12** For more detail on this, see Janson, Bürklin 2002: 140 – 151.

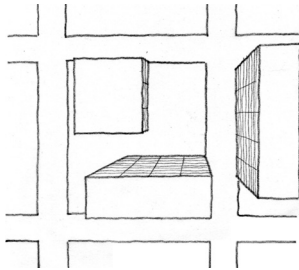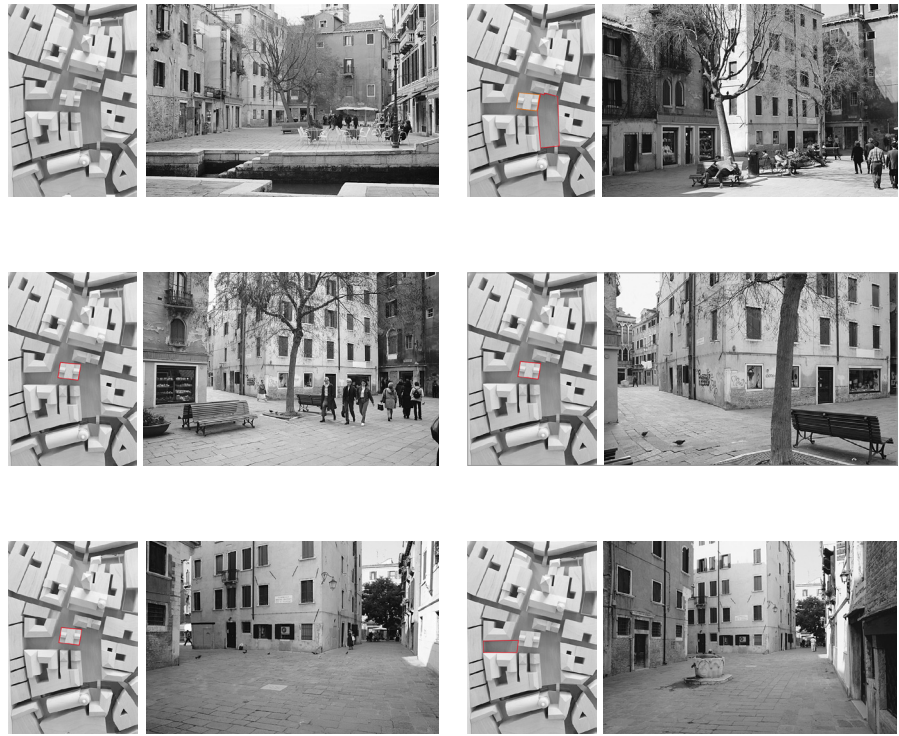**Fig. 2–7** *Campo Santa Maria Nova*, Venice



**Fig. 8** Mies van der Rohe, *Federal Center*, Chicago



**Fig. 9** Mies van der Rohe, *Federal Center*, Chicago

**13** For more detail on this, see Wolfrum, Janson 2016.

contour of a square, however, the outer side of the buildings and the inside of the square simultaneously claim the facade surface as a shared boundary in a kind of "rivalry over contour" (fig. 3). If we now aim for the building and walk around it, our perception suddenly switches: the building is revealed as a convex spatial (figs. 4–6). When seen from a neighboring square, our perception can suddenly switch again so that the other square has priority as a concave spatial figure in our perception (fig. 7).

Another example of the interplay of concave and convex, figure and ground, mass and space is found in the Chicago Federal Center (fig. 8). On the one hand, three buildings by Ludwig Mies van der Rohe form three architectural volumes with sharp edges. At the same time, however, they form the interior of a rectangular square. Mies deftly pushed the architectural volumes beyond the corners of the rectangle so that the square is closed off as an interior space (fig. 9). Depending on the point of view, the impression of the interior interacts with the effect of the building as autonomous volumes. They shove themselves in our path but at the same time their position guides our movement into the space. They offer resistance at first to both our eye and our approach but then they open up spatial depth in the space in between (fig. 10). The complementary relationship of space and mass becomes a continuous whole. It is the result of architectural talent, of the architect's creative ability in urban planning, since urban planning is architecture! [13]

It is clear that this switching is a dovetailing or mixing in which the difference of full and hollow is preserved, rather than a blurring. The tension experienced through movement is preserved only if the difference between solid volume and space is not blurred. The real work is the switching.

Even though architecture should always be understood as a constellation of spatial situations, it is always designed with material and experienced through our confrontation with mass and materiality. The masses that shape the space affect our senses through their material. Its surfaces and textures feed on the contrast between massiveness and porousness, between light and shadow. They become permeable in joints and openings and open up spatial depth.

For the perception of the interplay between mass and hollow space, one peculiarity of human perception is crucial; it can be defined as the "spatial extension" of our personal sphere of space. The anthropologist Helmuth Plessner remarks of it: "nestling in, going with, probing, being filled up, the thousand ways of living in attitudes and through attitudes giving the silent image of spaces and areas an immediate relationship to me are the ways to understand architecture."[14] We project our bodies into the architectural forms before us, so to speak, into their recessions, projections, and openings. The diverse interactions between surface and depth, the dovetailing of architectural volumes, of hollow and interim spaces include the back and forth of resistance and close contact, pressure and suction, rejection and seduction. Building masses force themselves toward us or recede from us into the depth, compel us and let us loose. Do we not also extend the feelers of our personal spatial sphere into tight hollow spaces, into small pores?[15]

Such experiences become even clearer if we expand the scale further or simplify it by incorporating masses of rock and channels in the terrain, mountains, and valleys. In the fractal course of a rocky coastline, porosity ranges across all scales. In the architecture of the landscape, the contrast between the presence of voluminous mass and its negation, the depths of space, often produces an irresolvable tension (fig. 11). It remains unclear which of the two dominates. The very state of switching reveals a peculiar spatial quality. One characteristic state is that it is immediately and unavoidably bracketed

**14** Plessner 1965 [1923]: 249f.

**15** On this, see Janson 2013: 239–249.

**Fig. 11** Goinger Halt, *Wilder Kaiser*



**Fig. 12** *Sadell Castle*, Scotland

16 Hofer 1979: 24.



**Fig. 13** Space-Containing Zones (after Bernhard Hoesli)

17 On this, see the entries „Raumhaltige Wand", „Raum-Körper-Kontinuum", „Zwischenraum" in Janson, Tigges 2013.

with the material but at the same time exposed to an immense expanse. We can learn from such extremes for the benefit of architecture by making such conflict an object of the architectural composition.

Cloud

Now let's leave the large, rough scale. In his second approach, the observations should follow in the opposite direction of progressive refinement, dis-section, or dissolution. Starting out from the compact mass of a building, porosity can result, on the one hand, from eating away at the mass from inside (fig. 12). On the other hand, porosity can, as the historian of the city Paul Hofer expressed it, break down moving outward "the Cartesian rational, sharp-edged model of the city of hollow and full." (In the 1970s, Hofer advocated the theoretical approach of *Collage City*, along with Bernhard Hoesli at the ETH Zürich.) In the model he advocated of a "densely interwoven, layered city of the dovetailing of architectural mass and spatial design", he argues that "the building volumes are not armored but rather staggered, permeable, layered. The boundary between hollow and full is no longer the planar wall with perforated openings but rather contains space, a zone of interpenetration. The building and the open space interlock"[16] (fig. 13).

Passages or arcades, verandas, galleries, and courtyards are interim spaces within building volumes and can be categorized in various ways: spatial intersections that are not terminated sharply by an exterior wall but only partially surrounded, built over, or closed off in part, semipublic, semiprivate, half inside, half outside. They break down the strict division by which the exterior space is located outside the building volumes and the interior space within them.[17] In this way, compact architectural masses become perforated, dissected, they become increasingly porous. The tendency to break down is first revealed on the building shell. What happens, however, when
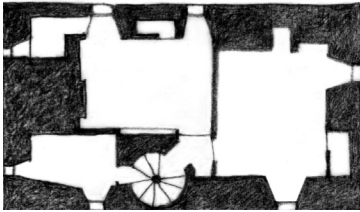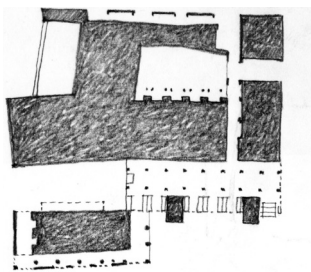
the masses and hollow spaces are broken down further and begin to be distributed as individual elements within the overall volume of the building? Elements of mass that form architectural space no longer have to appear as compact volumes but can also contribute to the shaping of space in a quasi-dispersed form (fig. 14).

Several peculiar observations can be made here, for example, in relation to the conditions of sight and movement. Otto Friedrich Bollnow made comparable observations about the forest:



Fig. 14 *El Amr Moschee*, Cairo

> "it is rather the obstruction of vision by the things themselves, [...] which enclose us in their own realm, almost as if in a kind of inner space. The gaze penetrates only so far into the forest and then loses itself among the tree-trunks. [...] Man is enclosed in a narrow space, though this has no firm, assignable boundary. He can to a certain extent move freely. He can walk through the forest. But as soon as he enters it on one side, he finds no escape from the imprisonment of his gaze and he does not gain freedom, for the narrow, observable area moves with him, like his shadow; he cannot get rid of his constriction, but remains enclosed in it." [18]

[18] Bollnow 1963: 218.

What at first seems like an obstacle turns out to be a condition of a specific state. It is the characteristic form of movement in such dispersed distributions of masses, the drifting, a kind of movement that is not steered in directions determined by the architecture but in which one can allow oneself to be swept about or can adopt an individual rhythm of movement and thus produce spatial connections solely by their own movement.

When the material of voluminous masses is broken down further, it changes its character again. The Japanese architect Kengo Kuma, for example, sees here atmospheric effects that building materials and architectural elements do not otherwise have; emphasizing:

> "No matter how rich the tactile qualities of materials are, if they appear as single masses, then to me they are not vivid, because they do not change their expression. If materials are thoroughly particlized, they are transient, like rainbows. At times they strongly appear as objects, but with a momentary change of light, or in respect to the observer's movement, they instantly disperse like clouds and dissolve like mist." [19]

[19] Bellmann 2002.

It is the atmospheric character that lends its identity and unmistakable character to a cloud-like spatial structure. Dispersions of elements of mass have not sharp boundaries. At first, they appear before you like a kind of diffuse swarm. Suddenly, you end up inside and then unexpectedly are outside it again. They perhaps permit architecture to dispense with boundaries or spatial partitions. Depending on the density of the dispersion, the entrance can also offer a certain resistance, for example, in undergrowth or a shrub. On entering, you have to work off the resistance to mass, to eat your way in or through, so

**Fig. 15** Jürgen Mayer H., *Schaustelle*, Munich

**20** Kaltenbach 2013.

to speak. But once you have penetrated or plunged into the interior, such a form of shaping space permits continuously variable hybrid forms between separation and connection or of different states of spatial density. Jürgen Mayer H. has said of the temporary architecture of his Schaustelle (Display place): "We wanted to make an architecture like a background noise, a structure that only becomes a building when it is performed"[20] (fig. 15).

On the one hand, such structures can be perceived as a "noise" ("Rauschen"); on the other, they can also produce a "buzz" ("Rausch"). Being exposed on all sides to the diffuse rush of countless small and tiny elements can have a confusing effect, much like that of a snow flurry. In the story *Bergkristall (Rock Crystal)*, Adalbert Stifter described such a situation from the perspective of two children wandering about:

> "In the meantime, while they kept on, the snow became so thick they could see only the nearest trees. […] But on every side was nothing but a blinding whiteness, white everywhere that none the less drew its ever narrowing circle about them, paling beyond into fog that came down in waves, devouring and shrouding everything till there was nothing but the voracious snow. […] After a time rocks suddenly loomed up dark and indistinct in the white luminescence […]. After a time the children left them behind and could not see them any more. As unexpectedly as they had come in among them, as unexpectedly they came out. Again there was nothing about them but whiteness, with no dark interruptions looming up. It seemed just one vast fullness of light and yet one could not see three feet ahead; everything was closed in, so to speak, by a single white obscurity, and since there were no shadows it was impossible to judge the size of objects."[21]

**21** Stifter 1961 [1852]: 40, 46.

The blurriness of such noise can lead to hazy configurations or structures of uncertain value as reality appearing and disappearing involuntarily. Leonardo da Vinci famously spoke of how such confused mixtures could stimulate the imagination when he said:

**22** Leonardo da Vinci cited in Klinger 2013: 58.

> "when you look at a wall spotted with stains or at rocks of diverse mixture, if you are about to devise some scene, you will be able to see in it a resemblance to various landscapes […]. [I]t should not be hard for you to stop sometimes and look into the stains of walls, or ashes of a fire, or clouds, or mud or like places, in which, if you consider them well, you may find really marvellous ideas. […] [B]y indistinct and uncertain things the mind is stimulated to new inventions."[22]

**Fig. 16** Transsolar; Tetsuo Kondo, *Cloud-scape*, Biennale 2010, Venice

Finally, a state of most delicate atomization of the mass has been achieved with the cloud (fig. 16). In this case, the architecture, as a quasi-structural system, does not break down into the duality of mass and void but rather exists in an interim state of nearly homogeneous mixture. It is perhaps a qual-

itative jump, since while thus far we could design architectural space almost exclusively indirectly, by arranging architectural masses accordingly, now we can work with the substance of spatiality itself. The architect Philippe Rahm, for example, has claimed "to work directly on space itself and to design its atmosphere by shaping temperature, vapor or light."[23]

I will leave it open whether porosity in the extreme form of the most delicate atomization and mixture of the tiniest particles of solid volume and space (fig. 17) does not perhaps open up for architecture new possibilities, such as creating atmospheric conditions of their very own, possibly poetic quality.

**Fig. 17** *Heian-Schrein*, Kyoto

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Alban Janson studied architecture at the Technical University of Darmstadt and at the University of Karlsruhe. From 1977 to 1979 he worked as a city planner in Dar es Salaam (Tansania). Subsequently followed artistic studies at Städel academy in Frankfurt am Main. Since 1989 Alban Janson operates an architectural practice together with Sophie Wolfrum. 1994–2013 he held the chair for basics of architecture at the Karlsruhe Institute of Technology teaching architectural theory and design, research activities on the phenomenological foundation of architecture. Alban Janson lives and works now as freelance artist in Munich. Recent publications: *Fundamental Concepts of Architecture. The Vocabulary of spatial Situations* (Basel 2014 with Florian Tigges); *Architektur der Stadt* (Stuttgart 2016 with Sophie Wolfrum).

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## Figures

*Fig. 1*  Alban Janson, according to Fritz Schumacher

*Figs. 2–12*  Alban Janson

*Fig. 13*  Alban Janson, according to Bernhard Hoesli

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## Recommended Citation