After decades devoted to the visible, in which a subjective approach and “storytelling” shamelessly replaced the progressive and moral programs of modernity, we are now in a new and extremely interesting period. A slippage of the real from the visible toward the invisible is taking place, and a shift of architecture toward the microscopic and the atmospheric, the biological and the meteorological.

The considerable progress in life sciences on the one hand resonates now on the other with the study of the climate and concerns about planetary warming. The field of the visible, until now saturated with symbols, morals, stories and individual interests, is in the process of deflating, emptying, diffracting, lightening, deforming and de-programming. Unfurled between the physiological and the climatic, between determinism and freedom, this open field, fluctuating and undetermined, has become the space for a new humanist landscape.

We want to re-establish the language of architecture with the knowledge of this shift toward the invisible and to stretch architecture between the infinitely small and the infinitely large, between the physiological and the meteorological. We want to reposition the essence of the elements of architecture subsequent to this disintegration of the visible. The tools of architecture must become invisible and light, producing places like free, open landscapes, a new geography, different kinds of meteorology: renewing the idea of form and use between sensation and phenomenon, between the neurological and the meteorological, between the physiological and the atmospheric. We want spaces with no meaning, no narrative; interpretable spaces in which margins disappear, structures dissolve, and limits vanish. It is no longer a case of building images and functions, but of opening climates and interpretations; working on space, on the air and its movements, on the phenomena of conduction, perspiration, convection as transitory, fluctuating meteorological conditions that become the new paradigms of contemporary architecture; moving from metric composition to thermal composition, from structural thinking to climatic thinking, from narrative thinking to meteorological thinking. ‘Composition of the hourly renewal of the air, plan of the levels of relative humidity, inhabitable convection, thermal design, chart of the movement of air, pressures and depressions, stratification of temperatures’ as new ways of architectural composition; and to then to show its programmatic, plastic and sensual potential. Space becomes electromagnetic, chemical, sensorial atmosphere with thermal, olfactory and cutaneous dimensions in which we are immersed and which, by the act of inhabiting, we in turn compose with the breath, perspiration, and thermal radiation of our bodies; the physical, hormonal activity, our movements and clothing. Between the infinitely small of the biological and the infinitely large of the meteorological, architecture must build
unlimited sensual exchanges between the body and space, the senses, the skin, breath, the climate, temperature, or variations in humidity and light.

Until now, the gestation processes of the city and buildings have produced petrified narratives, frozen forms of social, political and moral conventions. They have created fixed cultural landscapes that once opposed the natural, irrational fluctuation of the countryside and climate. Now, overtaken by progress and the recent defeats of biology and atmospheric pollution, this dichotomy no longer exists. We can therefore reappropriate the tools of the natural to generate cities and buildings drained of their narrative, functionalism and determinism: buildings and cities that are then displayed as pure presences; fluctuating atmospheres, open, objective, ‘non-adjectival’ landscapes that we inhabit, thus interpreting them. Architecture as a new atmosphere and second meteorology is no longer the ‘subjective’ closed place of social and political relationships, but becomes the ‘objective’ open place where new social and political relationships can be invented. The two following projects are designed in this new route. Using thermal model software, their forms, shapes and functions are following the climatic dynamic of the space.

1 Digestible Gulf Stream

The problem of global warming has placed as the relationship between climate and architecture at the center of current preoccupations. In order to assume our responsibility in the face of these new ecological concerns, we must make the most of the moment in order to reappraise the field of architecture in a broader way, extending it to other dimensions, other perceptions, from the physiological to the atmospheric, from the sensorial to the meteorological, from the gastronomic to the climatic. A ‘Digestible Gulf Stream’ is the prototype for architecture that works between the neuralgic and the atmospheric, developing like a landscape that is simultaneously gastronomic and thermal.

Architecture should no longer builds spaces, but rather create temperatures and at-
mospheres. Here, two horizontal metal planes are extended at different heights. The lower plane is heated to 28°C, the upper one is cooled to 12°C. Like a miniature Gulf Stream, their position creates a movement of air using the natural phenomenon of convection, in which rising hot air cools on contact with the upper cool sheet and, falling, is then reheated on contact with the hot sheet, thus creating a constant thermal flow, akin to an invisible landscape. What interests us here is not the creation of homogeneous, established spaces, but of a plastic, climatic dynamic, the activation of forces and polarities that generate a landscape of heat. In this case the architecture is literally structured on a current of air, opening up a fluid, airy, atmospheric space. This architecture is based on the construction of meteorology. The inhabitant may move around in this invisible landscape between 12°C and 28°C, temperatures at the two extremities of the concept of comfort, and freely choose a climate according to his or her activity, clothing, dietary, sporting or social wishes.

The concept of thermal comfort depends not only on external temperature, but also on clothing, the physical activity of those who live in the space and their diet. For example, when we feel too hot, we have five ways of cooling down, which act on different scales:

1. reducing the air temperature in the room, for example by air conditioning (atmospheric solution);
2. drinking (physiological solution);
3. taking off clothes (social solution);
4. resting (physical solution);
5. stimulating a sense of coolness with the mind (neurological solution).

Each one of these solutions is architecture. Architecture is a thermodynamic mediation between the macroscopic and the microscopic, between the body and space, between the visible and the invisible, between meteorological and physiological functions.

We then propose to add two culinary preparations to the two plates that directly stimulate the sensory receptors of hot and cold at the cerebral level and that can be eaten or applied to the body. The first preparation, on the upper cold plate, contains mint, which has molecules of crystalline origin known as menthol that cause the same sensation in the brain as the coolness perceptible at a temperature of 15°C. The menthol activates the TRPM8 (transient receptor potential) molecular sensory receptors on the skin and in the mouth that stimulate the group of peripheral sensorial neurons known as cold-sensitive units. The second composition, on the lower hot plate, contains chilli, in which one of the molecules, capsaicin, activates the neuro-receptor TRPV1, which is sensitive to temperatures over 44°C.

The traditional field of architecture thus expands, operating on both the atmospheric and gastronomic scales, breaking down the barriers between internal and external, body and space, neurology and physiology. The sensations of hot and cold may be perceived as
much inside the body (diet) as outside (atmosphere). So the question of diet also comes into the field of architecture, on a par with its climatic dimension.

Our architecture extends between the microscopic and the macroscopic, the gastronomic and the atmospheric, the visible and the invisible. Architecture becomes a ‘gulf stream’ that polarises the contrasts on different scales (hot/cold, low/high, clothed/un-clothed, internal/external, rest/activity) to give rise to architecture as a convective movement of air, creating a place like geography, designing space like climate, atmosphere and gastronomy.

11th International Architecture Exhibition, Venice Biennale, Italy 2008
Curated by Aaron Betsky
Project 2008
Philippe Rahm architectes

2 Interior gulf stream
The thermodynamic phenomena of the Gulf Stream is one of the most fascinating model for thinking architecture today because it gives a route to escape from the normalization and the homogenization of the modern space. This climatic phenomenon is created by the polarization in the space of two different thermal sources: one high cold source at one side and one low warm source at the other side. This thermal polarization in the space generates a convective movement of air, which defines different zones with different temperatures.

Modernity led to uniform, consistent spaces in which the temperature is regulated around 21 degrees. The aim here is to restore diversity to the relation that the body maintains with space, with its temperature, to allow seasonal movement within the house, migrations from downstairs to upstairs, from cold to warm, winter and summer, dressed and undressed. For people to feel comfortable in a heated room there must be equilibrium in the exchange of heat occurring via convection between their bodies and the surrounding air. This equilibrium is of course relative to clothing, from nudity in the bathroom, to the thermal protection of blankets, to light clothing worn in the living room. Today, confronted with the will to economize energy resources, the demand is to set up in each building, and even each room, a precisely calculated thermal capacity in order to expend only the energy that is strictly necessary. The Swiss construction norm SIA 3842 thus gives the following indicative values for ambient temperature. (Table 1)

<table>
<thead>
<tr>
<th>Types of rooms</th>
<th>°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living rooms</td>
<td>20</td>
</tr>
<tr>
<td>Bedrooms</td>
<td>16 to 18</td>
</tr>
<tr>
<td>Bedrooms that may also be used as living rooms</td>
<td>20</td>
</tr>
<tr>
<td>Bathrooms</td>
<td>22</td>
</tr>
<tr>
<td>Kitchens</td>
<td>18 to 20</td>
</tr>
<tr>
<td>Hallways, toilet</td>
<td>15 to 18</td>
</tr>
<tr>
<td>Staircases</td>
<td>12</td>
</tr>
<tr>
<td>Laundry room</td>
<td>12</td>
</tr>
<tr>
<td>Drying room</td>
<td>12</td>
</tr>
</tbody>
</table>
Instead of warming all the space at the good temperature around 20°C, we propose to create in the house two sources of heat, like two different thermal poles creating a thermodynamic tension inside the all house: one pole is cold at 15°C and situated in the upper layers of air of the house. The opposite pole is warm, at 22°C situated in the lower layers of the space. A movement of air will be generated by this difference of temperatures and positions in the space. With the help of thermal model software, we analyze the variation of temperature and his distribution in all the space and find then places for activities, according to specific temperatures. The project process is thus reversed: a indoor climate is first produced and after, functions are freely chosen anywhere in the space related to the thermal quality required depending of activities, clothes, personal desires. An ecologic and economic gain is obtained at the same time by creating in the whole house a low average of temperature at 18°C instead of the 20°C in a normal heating system.

The floors and the open spaces are therefore designed to follow the form taken by the air in the entire height of the building, in accordance with vertical air movements in relation to temperature, and the functions that are suggested as a result. Next, various functions take their places in an obvious manner on this stratification from the coldest to the warmest.

Site for research and housing for Dominique Gonzalez-Foerster
Place: Countryside near Paris, France
Project 2008
Philippe Rahm architectes