

FROM THE GRID TO THE LAYER: POST-INDUSTRIAL CITY AS CITY IN (MORPHOLOGICAL)
TRANSITION

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FROM THE GRID TO THE LAYER: POST-INDUSTRIAL CITY AS CITY IN (MORPHOLOGICAL) TRANSITION

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ABSTRACT

Starting from the assumption that industrial settlements have different roles in urban fabric, depending on their location, on their typology, on their size and their age of settlement, as well as on the pattern and the structure of the city considered, the paper will examine productive areas through six methodologies of urban analysis methods, ranging from urban morphology approach to perceptive approach. The different methods are employed to understand a different formal role of productive plants and they are applied to several cases studies from all over the world illustrating historical productive settlements already regenerated or still waiting for reconversion and a contemporary productive sites.

The paper will analyze the way in which urban analysis methods can engender different visions of the city, and specifically different approaches in the regeneration design of industrial dismantled areas to tackle the common misconception that post-industrial cities are places where no clear urban form is recognizable anymore, suffering of a lack of global urban vision, looking for new city's identity and vocation. Depending on the capability of recognizing their urban role, industrial dismantled areas, can be either considered as brown fields that prevent urban renewal or as strategical elements to regenerate the city, providing new opportunities.

The final goal is to set a methodology of morphological analysis able to grasp the transitional character of urban phenomenon, reading the post-industrial city as a stage of a continuous transition in urban form and not as a final step. In this perspective urban regeneration processes of urban industrial

dismantled areas can be conceived as impermanent configurations originating from the historical traces and types but also anticipating future morphologies.

KEYWORDS

Urban morphology; transition; industrial settlements; layers.

INTRODUCTION

Starting from the assumption that industrial settlements have different roles in urban fabric, depending on their location, on their typology, on their size and their age of settlement, as well as on the pattern and the structure of the city considered, the paper will examine productive areas through six methodologies of urban analysis methods, ranging from urban morphology approach to perceptive approach. The different methods are employed to understand a different formal role of productive plants and they are applied to several cases studies from all over the world illustrating historical productive settlements already regenerated or still waiting for reconversion and a contemporary productive sites.

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of recognizing their urban role, industrial dismantled areas, can be either considered as brown fields that prevent urban renewal or as strategic elements to regenerate the city, providing new opportunities.

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1. POST-INDUSTRIAL CITIES ARE CITIES IN TRANSITION

1.1. From the industry to the city

The concept of city itself is strongly related to industrial revolution as the real change in population distribution and urban living patterns occurred with the industrial revolution in the nineteenth century. The development of industrial capitalism has shifted the balance between urban and rural. The proportion of people living in urban areas fluctuated between 4 per cent and 7 per cent throughout history, until about 1850 (Lowry, 1991). After the industrial revolution this proportion raised up to 30% in the Fifties of the XX century, but still growing even after the industrial crisis and during the deindustrialization process in Europe. Today more than 55% of population is living in urban context and UN estimate the urbanized population to raise 70% of the overall population by 2051¹. This continuous and endless urban growth might be one of the reasons why during the industrial age we thought that the industrial endless growing paradigm, and the urban endless development related to it, was the only

possible paradigm. In the same perspective the deindustrialization process has often been perceived as a phenomenon to counteract, wishing an industrial come back, driven by a new type of industry free from pollution and workers exploitation, to bring back wealth and incomes to our cities. This paper proposes a reverse perspective, considering, from the morphological point of view, the industrial age as a transitional age between pre-industrial settlement, proto-industrial city and post-industrial urbanization. In a more general way, in any age city's morphology ought to be considered a transitional configuration always hosting simultaneously morphological elements heritage from the previous era and other formal characteristics already anticipating the future stage.

Trying to focus on the post-industrial city we can assume that the morphological characteristics of industrial city related with the productive functions and the connected urbanizing phenomenon, such as transportation and mass workers housing, are quite evident while the formal consequences of the post industrial age are not that clear. This is also due to the fact that the concept of post-industrial cities should not be understood as a mere chronological or functional definition.

1.2. Post-industrial City. Possible definitions

A first possible acceptance of post-industrial city is a city which has been **characterized by a strong presence of industry** which has then left the specific urban environment to move away. In this sense it is important to understand how and when the industry has left the city. Following Marcel Smet deindustrialization taxonomy (Smet 1990), it is evident that the shape and the transformation potential of the urban settlement is directly linked to the kind of production settlement that was there before and also to the elapsed time from the industrial dismantling. In this sense we can observe several different cities from the industrialization

¹ United Nations World Urbanization Prospects 2018 <https://population.un.org/wup/>

phase till nowadays. Considering that in the European context the deindustrialization process starts from the beginning of the XX century in some regions, while in some others areas production sites still active till the end of the XX century, western cities become post-industrial cities in very different periods of the last century. For the same reasons, we might observe that the cities that have faced the deindustrialization process in the early years of the XX century, have then been dealing with a variety of urban phenomena leaving a multitude of physical traces characterizing a long transition from the industrial city, through the non-industrial city, toward a not-better defined contemporary city. According to this perspective the post-industrial city could be considered more a transitional phase of the city artifact, than a specific and final configuration. In a second, broader, acceptance, a post-industrial city is any urban agglomeration **developing in a socio-economic context in which industry**, industrial production, are no longer the main driver for economic development and social behavior. In this frame most of the European cities are post-industrial cities and it is difficult to envision a common urban morphology, for their historical cores as well as for their new developments.

A third possible, but restrictive acceptance, to address the post - Fordist city is to consider it as a city **where industrial production is still settled** but with a different spatial and social organization from the Fordist age. This case is still rare in Europe, but more and more firms are looking to relocate their productive site in urban context in western countries. As W. F. Lever explains very well in his text *The post Fordist city* (Lever 2011), if in urban terms, Fordism could be equated with the success of large cities and large urban systems, it's because the predominant modes of production required locations in large cities, not just as the homes of large industrial workforces but as the providers of the most advantageous sets of externalities. Nowadays, the growth of the small enterprises sector, requires less labor employed, more

flexibly, and the transition from employment in manufacturing to employment in services. In this sense Lever observes the 'uncongeniality' of the standardized towns, whose spaces differentiated according to function are no more suitable for the flourishing of small enterprises looking for the benefits of urban livability.

1.3. Urban industrialization as cycling process

Looking at these three possible definitions of post-industrial city, we realize that most of the European and western cities can correspond, in different proportions and in different parts of the urban territory, to all of them. In fact, despite the generalized de-industrialization process in Europe and north America, the urbanization process is still growing (Champion 2011). Transition from Urbanization to Suburbanization to Disurbanization, to Reurbanization (not forgetting Counterurbanization) is still going on, that's why we might assume that this is a cycle, not a linear process. Noticing that different countries and regions are at different stages of the de-industrialization process in a given period (Champion 2011), as well as different cities in the same region and different parts of the same cities are in different stage of the cycle, it becomes interesting to identify the different stages of this cycling phenomenon considering the different kind of city we are facing: are they inner cities, fringe belts, touristic cities, successful cities, shrinking cities? The only evident thing is that they all are *cities in transition*.

Speaking about cities in transition in literature, often means to speak about cities that are living transition phenomenon in their social, political or economic dimension. The urban built environment is often perceived as the final outcome of transition process which mainly concern other dimensions than the urban form itself. The Handbook of urban studies (Paddison 2011), identifies four types of cities coexisting dimensions at the same time in

the same Urbis: the city as environment, the city as people, the city as economy and the city as organized polity. Those "cities" have different but simultaneous evolutions that engender physical outcomes on the urban form. Therefore the second part of the paper proposes to use different analytical tools in order to catch the several layers of physical outcomes related to the various dimensions of the city. Industrial settlements are here used as index fossils to establish the relationship between the urban morphogenesis and possible urban regeneration design approaches.

In this frame it might be possible, aiming to set up new tools for urban morphological regeneration, to define post-industrial city through the identification and analysis of formal elements, or morphological characteristics, able to distinguish it from other types of cities. As a matter of fact the morphogenesis of the industrial cities has been broadly discussed and should now be considered as a departure point to investigate the post-industrial city in his multiple variations in order to trigger and to design regeneration processes. Its main characteristics are well known ranging from their growing size, to the territorial spread phenomenon related to the new ways of transport, the zoning technique separating housing from production areas and from social housing through multiple enclosures. Arguably the most important single topic to which geographical urban morphologists have devoted their attention is the process whereby urban areas have grown physically (Whitehand 2011). But if the paradigm in which industrial city has flourished was an endless growth paradigm, the post-industrial city is dealing with a de-growth, or sustainable growth, paradigm in the frame of which we have to look for new generative models able to implement multiple social instances but also able to reconnect heterogeneous part of the city as heritage from the Fordist city.

2. URBAN ANALYSIS AND CITIES' MORPHOGENESIS: POSSIBLE LINK

Attempting to propose a first step towards a systematic understanding of generative models of the urban form, at a large scale, Raimbault and Perret, define urban form as "geometrical properties of building layouts at the scale of a district" and they underline the lack of quantitative indicators to measure urban form, which is mostly analyzed only in relation to visual impression. The proposal of Raimbault and Perret is to focus on the coevolution of building layout and road network through a set of indicators considered relevant at a district scale. Those indicators are set on a square grid that allows to compare different generative models able to capture both bottom-up-self organizing processes and top-down-planning processes. The grid can be adapted to the scale of the analysis as well as to the specific thematic focus on urban analysis. This kind of approach highlights how much urban analysis is a pair of glasses through which different phenomena and different characteristics of the urban fabric can be highlighted depending on the lens that we choose.

Urban industrial settlements are taken as case study to understand the possible link between the urban analysis method and the morphogenesis of the city for several reasons. First they often have driven, in the last two centuries, important city's expansion becoming the main catalysators for entire new neighborhoods structured by the industrial patterns and landmarks. As those cities have grown, the originally peripheric industrial suburbs have become central parts of the city and are nowadays strategic locations close to core city's center. Besides, those settlements are frequently characterized by bigger plots than the average of the urban fabric, allowing strategical urban transformation facilitated by the concentration of the real estate ownership. For all these reasons, urban industrial areas, even more when they are already dismantled areas, represent strategical factor for

morphogenesis or morpho-regeneration process of the city's fabric. The contemporary challenge is to understand the specific role that industrial settlement have played in the original morphogenesis of the city as well as the role they can play in contemporary regeneration of urban fabric.

The methodology proposed in this paper consists in defining six types of morphological relationships between industrial settlements and the city. Those six possible role performed by the industry in the urban context are infer from a broader observation of European main – former or present - industrial cities. For each type of relationship, a couple of urban analysis methods are suggested to foreground the specific formal role of the productive settlement analyzed. The hypothesis is that each method enables the understanding of peculiar interactions between the elements that generate urban form that are directly related to the morphogenesis of the city. The six types of interactions, the six different roles, mentioned depend on the type of industry, on the stage of urban development and on the preexisting morphological structure of the city. In this frame, productive sites can be considered as a new pattern in the city, a landmark on the urban landscape, a focus for new directions of development, a rift in the urban fabric, an urban scenery or a real city into the city itself.

2.1. Industrial settlements as pattern matrix

Some industrial settlements have been able to generate new patterns of the city, and therefore to trigger a brand new urban fabric based on the industrial building typologies, on the logistic principles and on the specific needs of the production. Because those settlements are characterized by building types and the streets and plot network, the best way to analyze their pattern is to merge the two traditional urban morphology analysis. The Muratori approach (Muratori 1960) operates a systematic building survey specifically focusing on the ground floors survey to highlight the relationship

between private and public space. Building a sequence of historical buildings survey of the settlements, Muratori's analysis reveals the "hidden structure" of urban phenomena, the morphogenesis process. Applied to the Michelin Area (fig. 1) developed in the second part of the XIX century in the northern part of Torino (Italy), this type of analysis unveils the original connection between the contemporary urban fabric and the pattern enclosure inside the dismantled factories' wall. The other school related to morphological approach, the Conzenian approach (Conzen 1960), can usefully complete the Muratori' s analysis. Actually Conzen focus more on the arrangement of street and plots and therefore allows to understand how the industrial needs, in term of movement and circulation, engender the urban pattern of street and how the plot's characteristics of the industry is able to deal and/or to influence residential surrounding patterns. The regeneration of the industrial Docks on the riverside of Marseille well illustrates urban design centered on the reconversion of the industrial pattern driven by the conzenian approach.

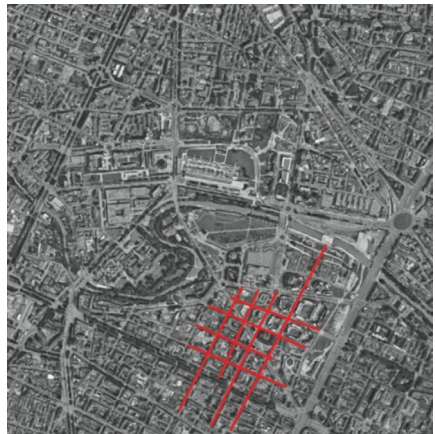


Figure 1. Industrial settlements as a pattern matrix (author 2020)

2.2. Industrial settlements as new expansion directions' drivers

Other productive sites don't properly structure new patterns, but determine the directions for urban expansions. The modern city has then grow in a fragmented and discontinuous way along those axes as shown in the early XX century by the south development of the city of Torino toward the new settled FIAT Factory of Lingotto (fig. 2) or as it is happening by now in Maranello with the brand new Ferrari's Factory designed by Jean Nouvel in the outskirts of the city. Therefore to analyze these heterogeneous new parts of the city we attempt to disassembly complexity, trying to break up the urban fabric into elementary urban entities as suggested by Paola Viganò (Viganò 1999). This helps in understanding the new characters of the contemporary city where buildings are no more space definers, like in the traditional compact city, but have become space occupiers. In this frame the definition of the contemporary urban elements and their relationships enable to read the city as an overlapping of layers no more ordinated through a general plan but generating an urban fabric apparently chaotic, characterized by the intersections and the conflicts of the multiple layers. In this context a non-built element of the city turns to be essential to better understand the morphogenesis of the city: the study of the flows. Pioneered in the Seventies by Bill Hillier (Hillier 1982,) together with his colleagues at UCL, Space syntax analysis aims to analyze and represents the spatial accessibility in the city at different scales. This type of analysis makes the invisible visible describing how urban morphology can have deep impact flows' circulation and attempting to design new urban masterplan able to ensure, through the location, the position and the spatial layout of building elements, a more accessible, and therefore livable, cities' expansions. The reconversion of the La Villette productive site in the far

suburbs of Paris by Bernard Tschumi is completely based on a layer's rationale which is able to organize the people fluxes, as it is now a scientific public park, but also to keep memory of the industrial past traces.



Figure 2. Industrial settlements as new expansion directions' drivers (author 2020)

2.3. Industrial settlements as a city in the city

In some cases, the industrial settlements are so big and so complex that they can be considered as "city in the city" in the sense that they are made by several buildings, a network of internal streets and open collective spaces, together with representative buildings, just like a real, traditional city. Very often those kind of settlements, raised from a small nucleus far from the city, has grown so much that when they came close to the city, or the city has grown up around the industrial settlements, they begun to need a precinct, a wall, to preserve the safety both of the citizen and of the workers. To understand the mutual relationships between the enclose pattern of the industrial site and the urban pattern of the neighborhood surrounding the industry precinct, the reading of basic

buildings types set up by the Muratori's follower, Gianfranco Caniggia seems to be a very useful tool (Caniggia 1979). The three steps of this urban analysis methods - to understand the historical reasons for urban form, to overcome them and to recognize the continuity in the morphogenesis of the city – enable to highlight the aggregation systems of buildings types and how urban tissues are generated through time in mutual relationships. The observation of the evolution phases of the urban structure shows as cities are made by continuous aggregation of unitarian, often originally homogeneous, nucleus or settlements. To investigate not only the topographical dimension of urban fabric, but to inquire also the aesthetical dimension of urban settlements, another Italian scholar, Cavallari Murat (Cavallari 1968) employ a conjectural survey to describe successive stages of the development of baroque cities in Italy detecting window's position, roofs' protrusions, entrances, porches and courtyards to describe the aesthetic evolution of the urban form. These elements specifically enhance how industrial buildings, for their types and for their formal elements, are, depending on the different phases of the urban evolution, part of the whole city, as in the case of the "White meat city" in Copenhagen (fig. 3) or a totally separate settlement, as in the case of the Matadero in Madrid. This character fundamentally impacts on the regeneration physical outcomes: if in the first case the district of White meat has been slowly and gradually reconverted by private investments into a restauration and shopping district completely embedded in the urban fabric of Copenhagen, in the second case the Matadero complex still enclosed in its protective walls and its regeneration and transformation in cultural district has been financed mainly by the municipali.



Figure 3. Industrial settlements as a city in the city (author 2020)

2.4. Industrial settlements as landmarks

For their scale, and for their iconic and symbolic values, part of the industrial settlements often represent urban landmarks and strongly contribute to the "image of the city" as Kevin Lynch described it in his masterpiece in 1960 (Lynch 1960). Therefore it is fundamental, to understand in depth their role in generating urban form, to use perceptive approach to analyze those settlements comprising built elements with strong visual impact at the city scale. Industrial architectonic elements such as chimneys, monumental façades, entrance gates or wall strongly contribute in building the urban image and to improve its "imageability". The industrial sites that have contribute, from the beginning of their development, to build this strong and vivid urban image, able to give identity, structure and meaning to the city, are nowadays not preserved as whole. Only elements recognized as landmarks are kept and protect by law, completely forgetting that their contribute to the urban image was not only made from those preserved exceptional buildings, but even from the relationships

that all the different parts of the site have built with the surrounding city. To catch these complex visual relationship the Gestalt theory is much helpful. Considering that “the whole is other than the sum of the parts”, the Gestalt scholar identify several “laws” able to explain how the human mind subjectively perceive the relation between the different part of an organism. Arnheim applies these laws to architecture (Arnheim 1977) explaining how urban space is made from interplaying forces generated by built objects and how the perception of the space become dynamic arising from couples of antithetic values such as verticality/horizontality, empty and forlorn and so on. The perceptive approach seems to be antithetical to morphological approach because it counterpoises subjective approach to objective approach, tridimensional point of view to bi-dimensional vision, and non-expert vision to expert analysis. But aiming to understand morphogenesis’ process of the city, in order to set un design guideline to regenerate urban industrial dismantled areas, the two approaches seem to complete each other adding a democratic dimension to the historical established tradition, explicating collective feeling to foster cultural identity, and being, both, pre-operational tools for the transformation of the city. This integrated approach is the key factor of the successful masterplan for the regeneration of the Van Nelle plant in Rotterdam (fig. 4) designed by Wessel de Jonge. In this project the new masterplan recognize the plant as an organic complex, a city in the city, and the buildings to be kept are decided according to their role as landmark for the industrial settlement and for the city. For the same, as the continuous glazed façade constitutes a real landmark for the urban landscape, the glass envelope it rebuild to look exactly as the original despite to the energetic issues: this important value is recognizable only through a perceptive analysis.



Figure 4. Industrial settlements as landmarks (author 2020)

2.5. Industrial settlements as a scenery

A different case is when the industrial sites become, for their dimension and for their location, a sort of scenery, a background for entire neighborhoods or land pieces. The idea that a building, or a group of buildings, can constitute an urban scene in the frame of which other urban elements are located and perceived is not new. From the History of architecture of Auguste Choisy (Choisy 1877) to The art of building Cities (Sitte 1902) many scholars have lighted the role of perception in the urban design, but it is only with the *Handbook to design urban landscape* of Gordon Cullen (Cullen 1961), that the role of the movement is explicated. Analyzing the urban scene through the Serial visions tool, Cullen explains that when wandering through the city we perceive two different elements: the existing view and the emerging view. As human mind reacts to contrasts, the contrast between these two views generates the image of the city as a coherent drama that, in this perspective, can be designed. Being the starting point of several urban expansions from the end of the XVIIIth century on, industrial settlements often become a scenery for the successive developments growing all around them. In

this sense workers housing, public services and infrastructures but also new activities connected with the new suburb, organize their location and their pattern considering the industry as a given background dominating the urban landscape. This phenomenon is well illustrate by one of the more representative buildings of FIAT, the renown Italian car factory, the Mirafiori plant (fig. 5). The first building dates back to the thirties, when I was located in the countryside, but the site kept growing till the eighties. Around the industrial plant housing, commerce and a big planted boulevard axed on the offices' building were built using the productive complex as a foreground, as a monumental scenery.



Figure 5. Industrial settlements as scenery (author 2020)

2.6. Industrial settlements as a rift

The multiplicity of roles that Industrial settlements can assume in the city analyzed in the previous paragraphs are all based on a specific type of interrelation between the productive site and the urban organism. The last role that we can observe is when no relationship is established between the city and the industry because the industry constitutes a sort of rift, of scarf in the urban fabric. Considering the land, and the city as well, as a palimpsest, André Corboz (Corboz 2001)

suggests to read them as layered structured where traces from the past have been erased but still recognizable here and there by emerging fragments. To recognize the meaning of those emerging elements they have to be read as a part of a same layer. The palimpsest metaphor allows to consider the urban fabric as a parchment sheet full of inscriptions and traces left behind by society and construction not always taken into consideration when a new layer, like the productive layer, is added to the city. Therefore, following specific functional and logistical needs, sometimes industries are built up without any consideration to the previous rural or urban traces. The result is that the layout of the built elements as well as their pattern and their boundaries cut the city without any consideration for the existing urban pattern or connections. This is the case of the Ebbinge industrial suburb of Groningen in the Netherlands (fig. 6), where the industrial development of the early XX century consists in a series of productive pavilions built regardless to the previous urban pattern or to the surrounding plots. The regeneration operation called open Lab Ebbinge, assumed the rationale of the industrial original settlements, and promote a temporary settlement made of contemporary pavilions deliberately in contrast with the surrounding urban fabric, belonging to the pavilion layer of the historical factories.



Figure 6. Industrial settlements as rift (author 2020)

3. CITIES' MORPHOGENESIS: TRANSITION AND HYBRIDIZATION

Attempting to set a methodology of morphological analysis able to grasp the transitional character of urban phenomenon, reading the post-industrial city as a stage of a continuous transition in urban form and not as a final step, this paper describes a possible classification of the role played by industrial settlements in the city. It is essential to remark that this taxonomy does not aim to establish fixed urban types or unambiguous relationships between industrial settlements and urban context. This sort of Atlas of industrial settlements' roles is set up through the induction method, from the observation of a multiplicity of case studies, general types are defined. The final goal of this methodology is to analyze urban dismantled areas in order to improve the outcomes of their regeneration process and of the redesign of consist parts of the city. As the taxonomy is based on the observation of multiple cases studies, it can be considered as an abduction operation. The abduction process proceeds from a single case study, or an innovative proposal, to formulate a new hypothesis, which is not yet a law or a rule, but just a possible principle to be further investigated, validated or fine-tuned. In this sense the industrial settlements can be firstly considered as playing one of the six roles identified and therefore analyzed through the urban analysis methods associated to each urban role. This first analysis is likely to highlight the non-matching elements, suggesting that all urban context are complex system non reducible to a single type of relationship between productive sites and city's pattern. Therefore the methodology forecasts to apply successively more than one urban analysis method to reflect the complexity of the urban palimpsest. Following the more commonly accepted conception of complex system as a system which is linked to the unpredictability of its evolution in time,

the contemporary complex city is evolving in a vertical way, by transition in time, and in an horizontal way, by hybridization in space. To look at the city assuming those two actions, transition and hybridization, as the two main morphogenetic processes, might be effective in overcoming the fixity of urban types and in unveiling the relationships between urban elements often considered as inconsistent or corrupted while there just evidences of a city in transition.

Assuming the industrial age as a transition phase means to conceive the urban regeneration techniques not aimed to design a definitive urban design configuration, but rather to outline a flexible grid able to give consistency and meaning to the next steps of urban development. Urban regeneration projects should then plan the different urban functions as temporary and organized by layers, conceived as overlappable with a certain autonomy towards the grid that ensure their assemblage with an internal consistency. The final goal of the whole urban regeneration process, from a morphological point of view, is to improve the sense of urbanity. But what is "urbanity"? Irrespective to ages and geographical context, the essence of the city deals with mixité instead of zoning, with walkability, flexibility of spaces and infrastructures, with gathering spaces. The combined approach proposed, mixing urban analysis methods and bridging urban analysis with design, envisions urban regeneration as the process of repairing the urban grid, reconnecting the existing fragments, not searching for urban growth, but adding temporary, consistent and meaningful layers to this grid.

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