

# The Grammar of Urban Transformation: A Tale of Two Cities

MURAT CETIN  
University of Sheffield

## INTRODUCTION: PIECES OF A PUZZLE; URBAN RENEWAL, NEW & OLD, CHANGE & TRANSFORMATION

The way “new is added onto old” has always been the central issue for architectural renovation. Similarly, it lies at the very heart of the urban renewal phenomena and only few studies have concentrated on this aspect. The “New City”, as a product of an evolution, implies both a reconciliation process of “new” and “old” within ongoing change and an “underlying continuity” within a particular context.

## RECONCILIATION OF “NEW” & “OLD” IN THE CITY

Is it really possible to melt these conflicting ends which seem to increase everyday in our technologically oriented era? Theoretical approaches, so far, have varied from “picturesque movement” to “critical regionalism.” The wide spectrum of design attitudes ranging from the “typological approach” to “deconstructive approach” represents the ambiguity of this field. In that sense, architectural practice of intervention to historic sites, either *sensitive* or *contrasting* from the viewpoint of their approaches to existing context, can be considered as environmental surgery. In the case of sensitive interventions, a preliminary examination of the examples by competent designers<sup>1</sup> may reveal underlying principles of successful intervention to historic context, shedding light on the analysis at urban scale. The new and old that are visually separated and emphasised are connected by a common *language*. The interpretations of urban stratification in analytical forms allow access to a primary grammar of intervened buildings or contexts. The interventions seem to be compatible with the originals by referring to their principal geometrical/algebraic regularities (i.e. rhythm, proportion or organisational principles). Meanwhile, in contrasting interventions, also, existing regularities and recursivities are maintained. Continuity with what exists is explored not in visual terms but through grammatical terms mentioned above. Such an implicit continuity enables functional adaptability, lighter construction, flexible use of new materials, technologies and metaphorical uses of forms.<sup>2</sup> Thus, one could conclude that interventions are compatible as long as they have either or both kinds of continuity with the host — i.e. *grammatical rules* or *formal vocabulary* of the architectural language.

## UNDERLYING REGULARITY AS CONSTANTS OF THE CHANGE

It is of interest to know whether transformations can be characterised by an underlying regularity. Could one infer that repetitive patterns happening systematically may form an essential

basis of architectural continuity within a particular context? In fact, one can see similar inferences throughout history.<sup>3</sup> Thus, such recursivities could also be considered as the source of continuity in architecture and urban renewal.

Here, it is of utmost importance to encounter a crucially significant argument presented in this study. *Rhythmic articulation*, in many types of transformation seems to remain constant whereas formal attributes always change. Therefore, the concept of *rhythm* as a plausible principle recursivity which allows any kind of alteration, addition or synthesis, forms the key element of the discussion. Similarly, if architecture is considered as a language, *grammar* appear to be the underlying regularity. One may recall examples in literature in which the concepts of *underlying regularity* and *grammar* are utilised to explain the continuity within styles, types, works of a particular designer, or artefacts of a society. Most of these examples bear some underlying regularity based on “Shape Grammars” logic which was first introduced by Gips & Stiny,<sup>4</sup> and has later been spread into many fields of generative design.<sup>5</sup> The logic is simply composed of an *initial form*, a set of rules applied to the initial form, and *recursive structures* that determine the order and location of rules applied to that form. Thus, although forms might change, recursive structures remain the same within a particular style, period, society or context.

## UNDERLYING REGULARITY AND URBAN METAMORPHOSIS

The inevitability of change and transformation is clear at urban scale as much as it is at architectural scale. So is the assumption that an “underlying regularity” may exist for urban scale. Physical transformation in such contexts could be separated into its grammatical and vocabulary components. Similarly, grammatical regularities and recursivities might become indicators of continuity in physical transformations. Moreover, semiological deviations with respect to social, political, economical and cultural changes (e.g. context of 1960s or 1980s’ Turkey) could be related with grammatical continuity in the analysis of transformation. Thus, such a regularity might form the common ground between progress and preservation in those contexts. On the contrary to the conflict between new and old forms, or between renewal and preservation of the built environment, grammatical regularity could be established as the essence of continuity in time. Therefore, one of the concerns of this study is to extract universal principles from some concrete examples that old towns (such as Venice) presents. Another objective is to discover and visualise patterns inherent in these examples, and to postulate that behind those examples might lay a very culturally established set of longpersisted principles and traditions although they might not have been decoded or have been expressed in

different terms. Hence it suggests that patterns may contribute to a harmonious total effect in most of the well-known and long-transformed townscapes.

In the first of the following stories, it is proposed to examine a well-known example of urban transformation as the test for validity of the methodology of *formal grammars* at urban scale, so that the methodology can be used later on a Turkish case which form the final part of the study. Transformation of the Piazza San Marco has been analysed in the first part with reference to the visual, written information from different periods. The square is an urban space made up of ever-increasing transformations. Moreover, its townscape is derived from local tradition, hydrographic conditions and influences of other civilisations forming a blend of Byzantine, Romanesque, Middle Eastern and Islamic influences as further enrichment. Venice itself was, also, conceived as a gate to East and a small scale Constantinople (Istanbul in Modern Turkey) from which the following case study is selected. It is also possible to observe many common attitudes, between Italian and Turkish architecture, towards modernism and its tensions in the development of architectural idea. Combinations of climatic and cultural conditions conducive to outdoor living, are the other common characteristics of both Italian and Turkish cultures which led to a public life which gave form to street and square. Thus, Piazza San Marco is chosen as an appropriate and well-known example of urban transformation to validate the methodology of shape grammars at urban scale.

The next story of Taksim Square shows similar characteristics with Italian architecture in general and specifically with San Marco. Both Venice and Istanbul have always been cosmopolitan bazaar cities where East and West meets forming a bridge between Occident and Orient. Both cities have many admirers, visitors, and have been inspiration for many artists. The common features between the architecture of Venice and Istanbul can be summarised as an outlook for something that came from abroad, and typical contextualist bias arising along with its eclecticism and critical-historical reflection that radically tends to modify the notions of modernism.<sup>6</sup> The physical environment shows similar salient features. For instance, silhouette of Istanbul composed of minarets share the same vertical accentuation with the campaniles of Venice. Both waterways, Bosphorus and Grand Canal, have the same function of binding the city together functionally and visually. Tight and close organisation of houses is another commonality in addition to the organic network of circulation and emergent surprising vistas changing continuously with movement of the observer.

However, I must also stress that this is never intended as a chronological comparison since Piazza San Marco finished its transformation almost two hundred years ago approximately when Taksim Square, on the other hand, had started to develop as an urban space. In addition to the commonalities described above, the issue of continuous development and formal/diagrammatic features within both cases constitute the basis of this study.

### A STORY OF TRANSFORMATION; VENICE - PIAZZA SAN MARCO

In Piazza San Marco, the time dimension has added to the totality in a manner that each successive addition has respected the existing situation whilst providing a positive and sensitive contribution in order to represent both the past and present aspects of the culture. Such juxtapositions, sometimes inaccurate and contrasting, provide multiple reading to observer, enabling individual and separate experiences while facilitating perception of the unity of the whole. The result is an ensemble which balances duality and conflict.

In this section, the continuity of this tradition is examined with the interest to see whether a shape grammar logic could describe the transformation of Piazza San Marco. The shape grammar that is developed to demonstrate this transformation is based on plan layouts from selected periods of transformation. To simplify the

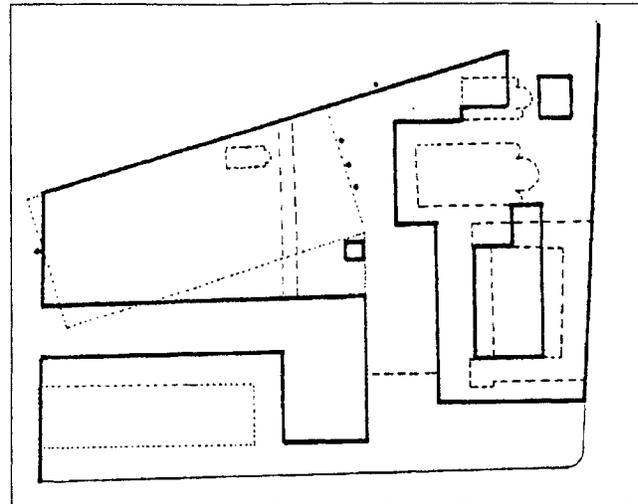


Fig. 1. Phases of evolution in Piazza San Marco, Venice. (1200s .....1500s After 1800s)

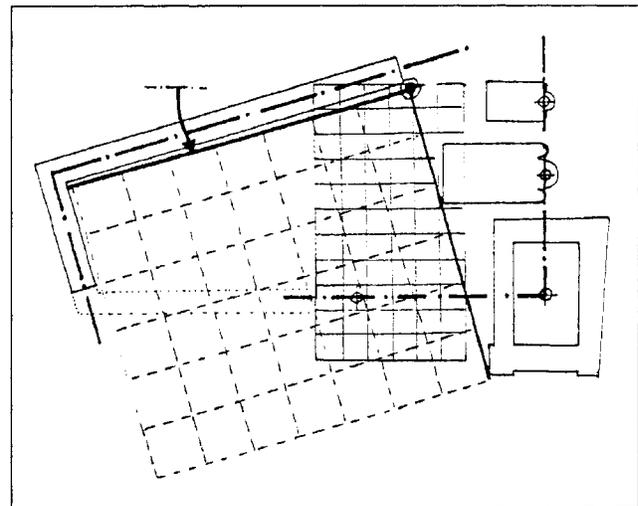


Fig. 2. Superimposition of grid systems and axes of peripheral buildings in Piazza San Marco, Venice.

definition of the grammar, certain details of the plans are abstracted. Thus the spaces and masses are represented as polygons. Initial forms are described as simplified geometric forms, and rules are defined in terms of Euclidean spatial inter-relations of those geometric forms.

It is assumed that urban transformation in Piazza San Marco can be divided into specific phases in accordance with the changes and interventions. And the continuity between those successive stages can be examined on the basis of the similarities between their recursive structures. Thus, two stages of transformation in Piazza San Marco can be compared with reference to the rules, and their recursive structures. The initial form of the plaza can be explained with reference to its formation during early tenth century. The plaza is defined by canals on both sides (West and South), settlement fabric in the North, and finally the Church on the other side. Therefore, the original form of the plaza can be described as a rectangle form defined by those elements. The rules are derived from the geometric transformations of the spaces added to this initial form. The patterns of relationships among the rules compose the recursive structures within the transformation of Piazza San Marco.

The examination above indicates certain similarities in the un-

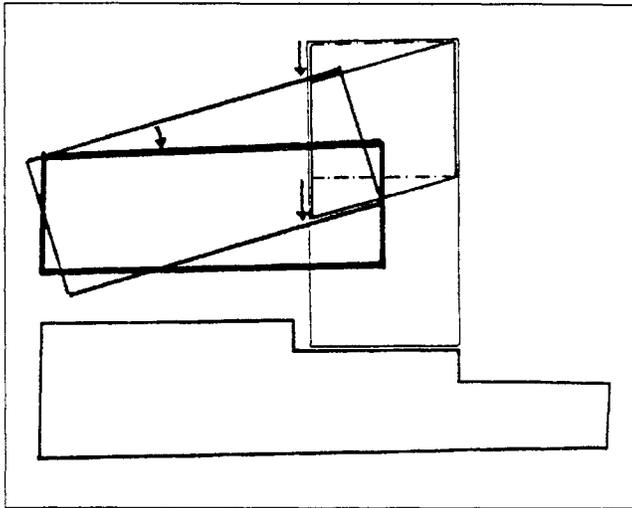


Fig. 3. Spatial relationships in the transformation of Piazza San Marco (increasing line width illustrates the order of transformation).

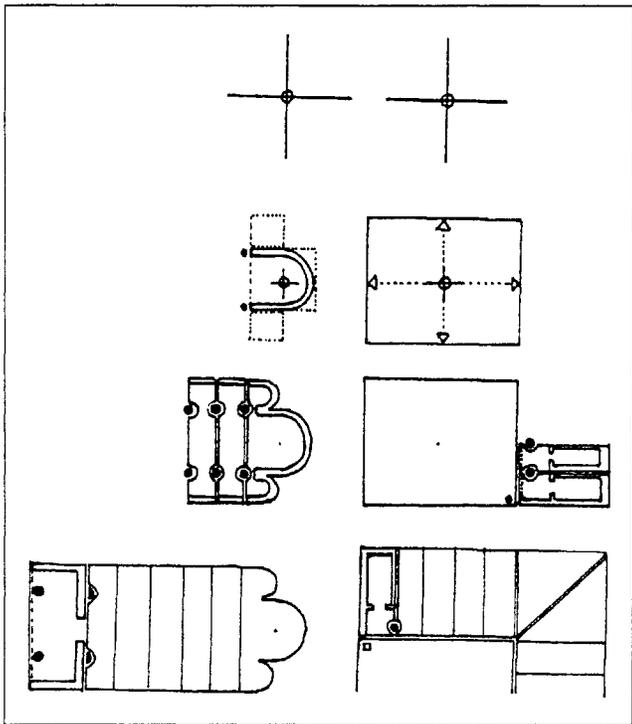


Fig. 4. Building generation rules. (Columns; building types. Rows; insertion point, generator form, recursive elements and termination).

derlying structure of rules applied to the *initial form* of the square through two different stages of transformation. If the overall transformation is analysed purely in terms of spatial relationships of abstract polygons, it seems possible to observe that number of applied rule operations appear to be equal for both stages divided around 1200s which is an important point of intervention to the square (Figure 1). If the analysis is further complicated, one has to consider two superimposed layers of orthogonal ordering systems acting upon the plaza (Figure 2). Here, grammars enable us to define rotation of the second layer over the first around a pivotal point (approximately where the cloak tower is located). This analysis may also show, in addition to the equal number of rule operations at each phase, an alternating order of spatial operations between original and

rotated layers (Figure 3). Moreover, when these operations are enriched by the building generation rules (Figure 4), one may observe that buildings are organised along two coordinate axes surrounding two juxtaposed Cartesian systems from the opposite ends. It, then, becomes possible to find a common shape grammar logic of the plaza which is composed of i) insertion point, ii) generator form, iii) recursive components of enclosure and iv) termination elements. Thus, it can be said that the recursive structures in the two stages of transformation are alike. Therefore the analysis of Piazza San Marco reveals that well-known examples of successful urban transformation might conceal some sort of underlying pattern which might be explained in terms of grammatical syntax.

## ANOTHER STORY; ISTANBUL - TAKSIM SQUARE

It is also of interest to understand underlying principles behind the ongoing physical transformations in other historical city centres. Therefore this study aims at showing the different amounts and qualities of physical change in different stages of physical transformation on a case from Turkey. In order to achieve this aim, the changes are examined at different stages of transitions in the evolution of urban design and interventions in Turkey. This study looks specifically into the latest period, in the intersecting areas of Turkish architecture, urbanism and conservation. Therefore, urban design competitions (that include partial conservation and renewal projects) from 1980s which constitute a specific period of transition in the history of contemporary Turkish architecture<sup>7</sup> are examined. The characteristic of change in that period will be compared with those of previous transition periods<sup>8</sup> to get a clear picture of the way that this transformation takes place.

## TAKSIM URBAN DESIGN COMPETITION - 1987 & HISTORY OF THE AREA

Taksim, originally a wooded area, was formerly a country cross-roads. Urban area settlement ended at Taksim until mid 19th century. The first building was the water distributor (Maksem) built in the 18th century; There was a reservoir building next to this fountain too. Artillery Barracks were built at the opposite end of the square over a century later. The cemeteries and recreation areas covering up the hills facing Bosphorus, has started to be removed at the beginning of the 20th century in order to leave their places to; apartment buildings, street facing them and later Opera building. An orthodox church was also built in late 19th century next to the Ottoman Maksem. The large mansions of the early 19th century turned into row houses towards the end of the century and into middle-rise apartments since early 20th century. Training Ground, too, was opened to settlement in 1920s with mid-rise apartment blocks. The road connecting this area to Galata (Istiklal Caddesi) was a very fashionable area where consulates and embassies — first of which was French consulate — were located. Tram was introduced into Istiklal Caddesi which was previously a pedestrian area. That area has always been the core of contemporary public life in Istanbul. Thus, Taksim gained its plaza character very recently. Further physical definition of the square by surrounding buildings is completed with the erection of the monument to the Republic as a landmark in 1928 (Figure 5). After the Ottoman period Taksim, with its monument, became a symbol of the new Turkey. It also has become an important location for political debates, demonstrations and public ceremonies.<sup>9</sup> During 1940s the Barracks were demolished in order to enlarge the square. This led to opening of larger boulevards starting from 1950s until mid 1980s. The area left from Barracks was converted to a park. After 1960s, in addition to demolitions of 1940s, high-rise hotel buildings (Intercontinental & Etap) and big-scaled buildings (e.g. Opera) started to emerge causing the destruction of many historic and small-scaled buildings on

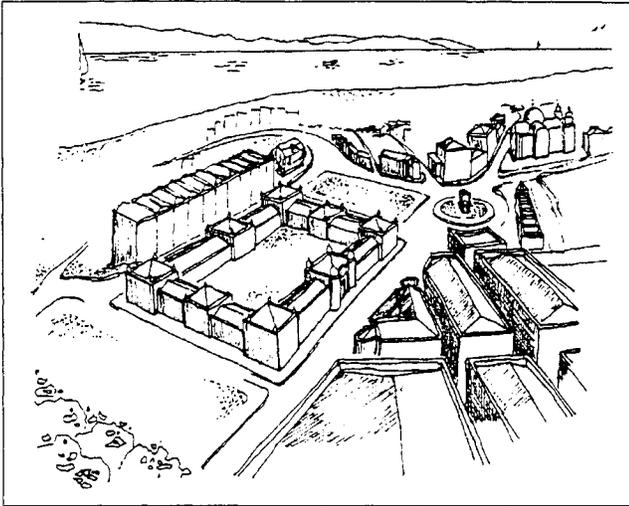


Fig. 5. Taksim Square, aerial view. (reconstruction circa 1930s).

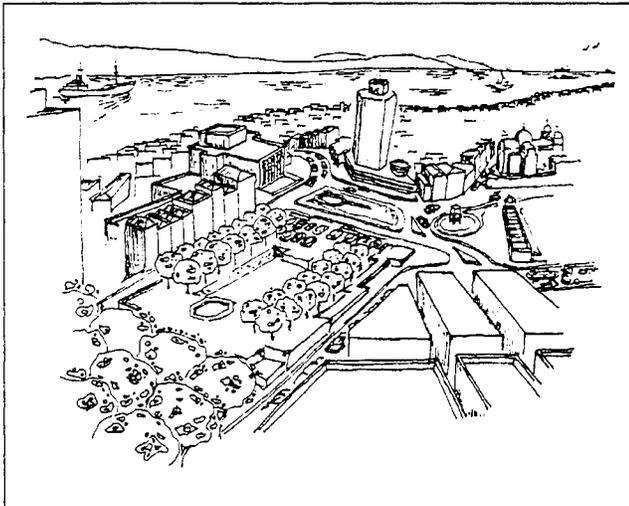


Fig. 6. Taksim Square, aerial view. (after 1980s).

the periphery of the square. Later, the area - with the influence of the hotels - became a traffic trouble spot. This junction got worse after opening of Tarlabasi Boulevard in 1985 (Figure 6).<sup>10</sup> Starting from 1950s, Taksim has been witnessing a legal struggle (mainly politically oriented) for building of a mosque. In order to solve traffic and open space problems of Taksim has opened an urban design competition. The building of a mosque was neither suggested nor prohibited in the competition requirements. The debates about mosque is still going on. The winning project, however, has not been implemented yet. Requirements of the competition mainly concentrated on introducing new cultural, recreational and commercial facilities in addition to the solution of traffic & reorganisation of urban space. Construction of underground has also started. Lately a gigantic hotel building has started to be constructed obstructing the view from the square towards Bosphorus. Recently, its construction stopped and top levels are being removed.

The continuity of transformation described above is tried to be examined in grammatical terms. As similar to the methodology applied to Piazza San Marco, the continuity between successive stages of transformation is examined on the basis of the similarities between the recursive structures. The initial form of the plaza can be explained with reference to the fountain and reservoir (Figure 7). The patterns of spatial relationships among the spaces added to

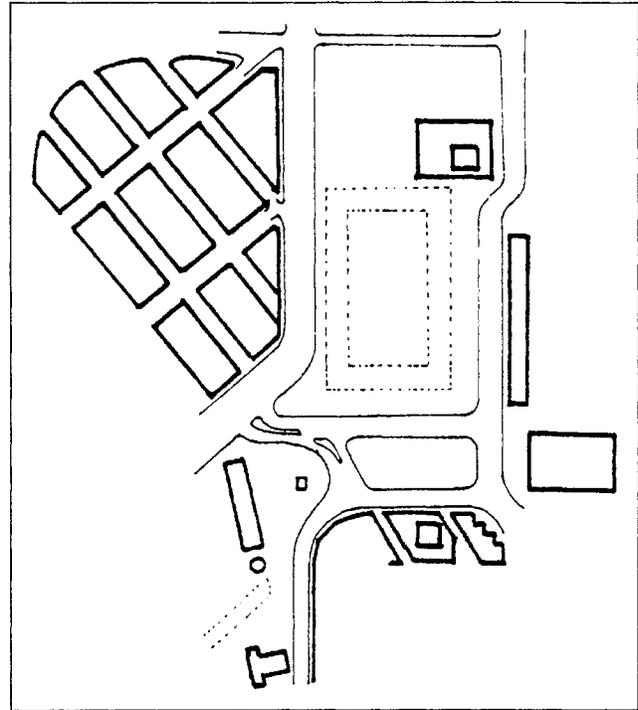


Fig. 7. Taksim Square, Istanbul (Plan showing main buildings).

initial form compose the recursive structures. Grammars enable the identification of a similar rotation around the Monument (Figure 8) which generates a parallel translation of Church-reservoir-Monument axis as the bisector of rotation. Sudden shifts in the rule operations among the layers determined by original grid, rotated grid and bisector axis help to identify the discontinuities in the transformation. Therefore, the analysis of Taksim Square, in addition to the results of Venice study, reveals that underlying recursivities of the ongoing transformation seem to be deviating in times of important social changes.

## DISCUSSION AND SUGGESTIONS

With regard to commonalities revealed by the grammatical analysis, one may observe that both squares are formed by the superimposition of two layers rotated around a peripheral pivotal point. The distinction between the two rotations is that latter is organised around a bisector derived from the axis of initial form while the former is rotated around the point which is directly determined by town fabric and echelon arrangement of Basilica San Marco and Doge's Palace. Consequently, one might suggest that the possibility of finding underlying grammatical patterns of transformation may increase as further components are introduced into the formal analysis process.

Although the thesis innovatively attempts to define urban transformation in grammatical terms, the idea which the study stems from is not new. There has always been a search for a certain type of continuity in phenomena surrounding human beings. This interest may be for *underlying units*, *stylistic features*, or *typological characteristics*. Alternatively, *rulebased systems*<sup>11</sup> may be the focus of such a search. Similar to the continuities of rhythm in music, of grammar in languages, of underlying units in ancient measurement systems, of underlying proportions in nature, the same sort of continuity can be expressed in terms of *formal grammars* in art, architecture and also in urbanism. Once this constant basis in design of form is established, its relation to social, economic, political and resulting behavioural transformation could be investigated. More-

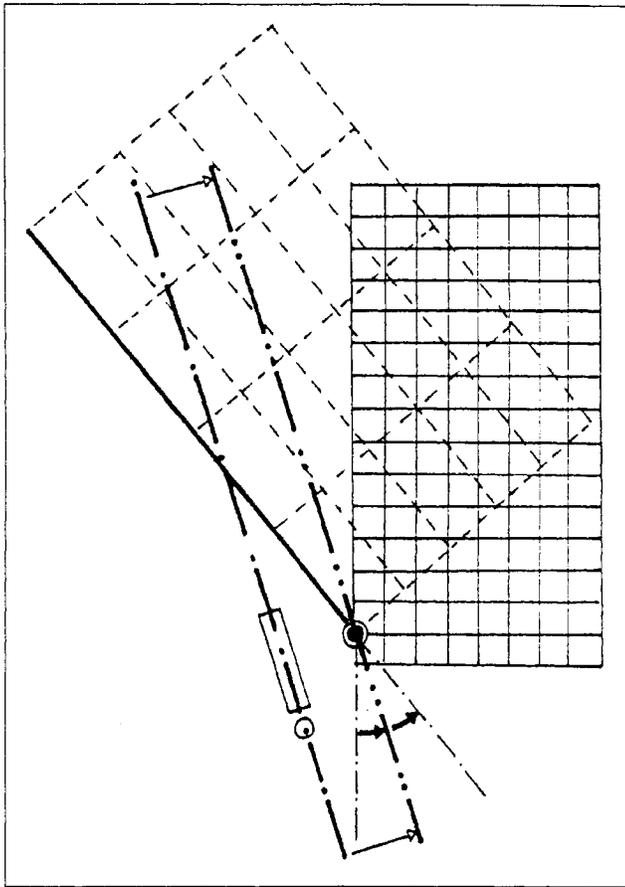


Fig. 8. Superimposition of grid systems in Taksim Square, Istanbul.

over, the focus within the search for continuity in design, which was previously on visual aspects, has recently started to shift towards processes and logical aspects of design, in direct relation to the increase in the use of computer based systems in planning and design. This study could prepare a conceptual basis of such a potential shift with particular reference to urban renewal and transformation.

It is assumed that within the framework of this study, the essence of a city lay not only in their specific forms but in the rhythmic relationships of the transformations of its public spaces. The question is how to shape the accretion so that an urban environment would be continuous and compatible in principle with existing form and meet changing needs of successive transformers. The contribution of this study could be considered notable for its reduction of urban transformation to grammatical essentials that underlie any or all periods allowing flexibility and diversity of approaches to the subject of intervention.

Finally, it is necessary to explain how the results of this study can be developed further and how they can be utilised in practice. The author hopes this study indicates a possibility of such a regularity so that further research can be carried out to arrive at a more accurate conclusion leading to a new theory of intervention. Within the framework of a new alternative theory, this regularity would form the basis of choice among a variety of intervention possibilities to historic centres. The conceptual model applied here can also be adapted for the study of different periods and locations to arrive at a better comprehension of the overall transformation. Thus, it might form a particular methodology for architectural research in the field of urban renewal. Another field in which the results and methodology of this study could be utilised is the architectural education

thereby seeing between the layers of historical transformation can make history a source of principles for design. I believe providing continuity through principles rather than forms themselves might contribute to reconstruct semiological disintegration in the built environment in less developed countries. Within the new century we are moving in, this concept promises to be more important as an assessment criteria than pastiche understanding of preservation and the devastating nature of modernist reductivism.

## NOTES AND REFERENCES

- <sup>1</sup> Grassi's "critical reconstructions," Scarpa's "creative restorations" and Dollgast's "creative reconstructions" can be named among these examples.
- <sup>2</sup> Foster's "technological insertions," particularly are typical examples of this attitude.
- <sup>3</sup> These examples cover a wide spectrum ranging from the use of Golden Section in ancient Greek architecture to Durand's building typologies, from Alberti's proportions derived from music to Corbusier's Modulor derived from human proportions.
- <sup>4</sup> George Stiny & James Gips, *Pictorial and Formal Aspects of Shape and Shape Grammars* (Brussels: Birkhauser, 1975).
- <sup>5</sup> Shape Grammars have been applied on a wide range of cases including: generation of Chinese ice-ray grill designs, George Stiny, "Ice-ray: a note on the generation of Chinese lattice designs," *Environment and Planning B* 4 (1977), pp. 89-98.; progressive growth in the arrangement of African Ndebele dwellings, Herbert, T. & Sanders, I., "African Shape Grammar: A Language of Linear Ndebele Homesteads," *Environment and Planning B: Planning and Design* 21 (1994), pp. 453-476 ; Palladio's villa plans, George Stiny & William J. Mitchell, "The Palladian Grammar," *Environment and Planning B* 5 (1978), pp. 5-18; correspondences between De Stijl painters and common patterns between Prairie and Usonian houses, Terry W. Knight, *Transformations in Design* (Cambridge: Cambridge University Press, 1994).
- <sup>6</sup> Christopher Hibbert, *Venice: The Biography of A City* (London: Grafton, 1988).
- <sup>7</sup> The period between 1980 and 1990, according to scholars from a wide range of disciplines, represent a specific and very important period of transition (after that of late nineteenth century) in the social, economical, political and subsequently in architectural history of the Republic of Turkey, which was established at the beginning of the century (1923) aimed at westernisation on the foundations of Imperial Ottoman heritage, however, denying its connections with it. Starting with the military regime of two years at the beginning of 1980s and followed by a re-democratisation process which brought integration with the world in many fields like; communication, technology, economy, politics, etc., an equal rise in the search for the ethnic, religious identity in the society has also been witnessed at that period. As a result of this intense interaction with the West during that period, post-modern culture and its new concepts (such as consumerism, search for identity, built image, historicism, pluralism, ambiguity of values, chaotic freedom etc.) also had their impact on Turkish society and architecture, which has not yet settled the impacts of modernism. Celal A. Güzer(ed.), *70 Sonrasi Mimarlik Tartismalari* (Ankara: Mimarlar Dernegi Yayinlari, 1996).
- <sup>8</sup> Turkey has always been under both western and eastern influences because of its geographical location surrounded by Europe, Middle East, Russia and Africa and its history (as a nomadic community moved from the steppes of Middle Asia towards inner Europe and finally settled in Anatolian peninsula) in this geography which had accommodated many civilisations like Hitites, Phrygians, Sumerians, Lydians, Galatians, Romans, Byzantians, Persians and Seljuks. The conflicts and the search

for synthesis between these two (occidental and oriental) pressures have been the essence of Turkish culture.

<sup>9</sup> Çelik Gülersoy, *Taksim; Story of A Square* (Istanbul: Istanbul Kitaplığı Ltd.,1991).

<sup>10</sup> Dogan Kuban, *Istanbul; An Urban History* (Istanbul: Tarih Vakfı Yayinlari, 1996).

<sup>11</sup> Works of George Stiny & James Gips (ibid.), Lionel March & Philip Steadman, *The Geometry of Environment: An Introduction to Spatial Organisation in Design* (London: RIBA Publications, 1971); Roger H. Clark & Michael Pause, *Precedents in Architecture* (New York: Van Nostrand Reinhold, 1996) can be named among those.