

The Process Evolved by Control Systems of Urban Design in the Mogul Epoch in India:

THE CASE OF FATHPUR SIKRI

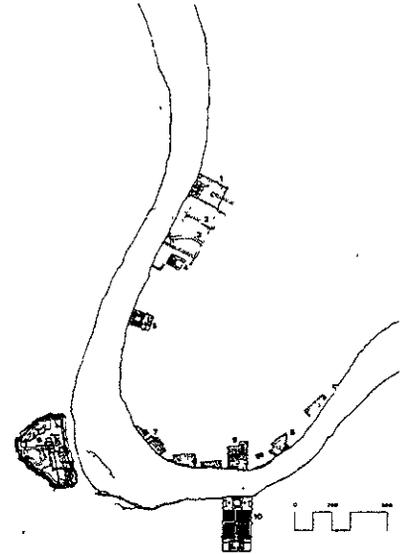
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The second half of the 16th century and whole of the 17th century are a very important period in the history of urban development in India: almost all the major urban structures that have come down to us — even if some were started in previous centuries — received their basic imprint in this period. Spanning the two centuries, in fact, there was fresh constructive fervour, which led to the founding of many cities, but also to the new phenomenon of seeking a monumental aspect, surpassing the very scale of the building. In pre-Moghul times, the city, even if founded, is not distinguished by any definite monumental form: it concentrates its attention on the citadel, the image and seat of power, which is a summation of single buildings, whose formal relation is often fairly frail, surrounded by powerful walls. At the foot of the citadel, the city of the inhabitants grows fairly freely, although following group settlement patterns and a very precise

hierarchical logic of spaces. In short, there is no intention by those in power to shape the overall form of the city in their own image and semblance.

From its earliest foundation, the efforts of the Moghul dynasty are concentrated on the administrative reorganization of the empire on a strongly central basis and nationalization and increase of land revenue. While therefore the colossal hydraulic works for irrigation and the maintenance of a road network with all its services in full efficiency belong to this general design, the enormous resources devoted to the construction of pharaonic building works or to the foundation of new monumental gardens and cities belong to a second design directly linked with the first: the desire to shape ex-novo the Empire's landscape.

The first two sovereigns, Babur and Humayun, are the first ones who attempt the design and redesign of the urban landscape. The technique is to assign to a great landmark the endeavour to bring order into the visual chaos of the Indo-Islamic town of the period, such as had been inherited from the previous dynasties. A deep-rooted belief of Hindu origin, accepted tout court by Islamic architects, who consider the building of a city on the left bank of a river to be ill-omened, means that all the main cities of northern India — Delhi, Benares, Allahabad and Agra — are on the opposite bank. Taking advantage of this particular condition, Babur, the founder of the Moghul dynasty, his successors and their dignitaries, to get away from the noise and confusion of Agra, build an uninterrupted sequence of gardens on the free left bank of the Yamuna, linked both by boat and by land.



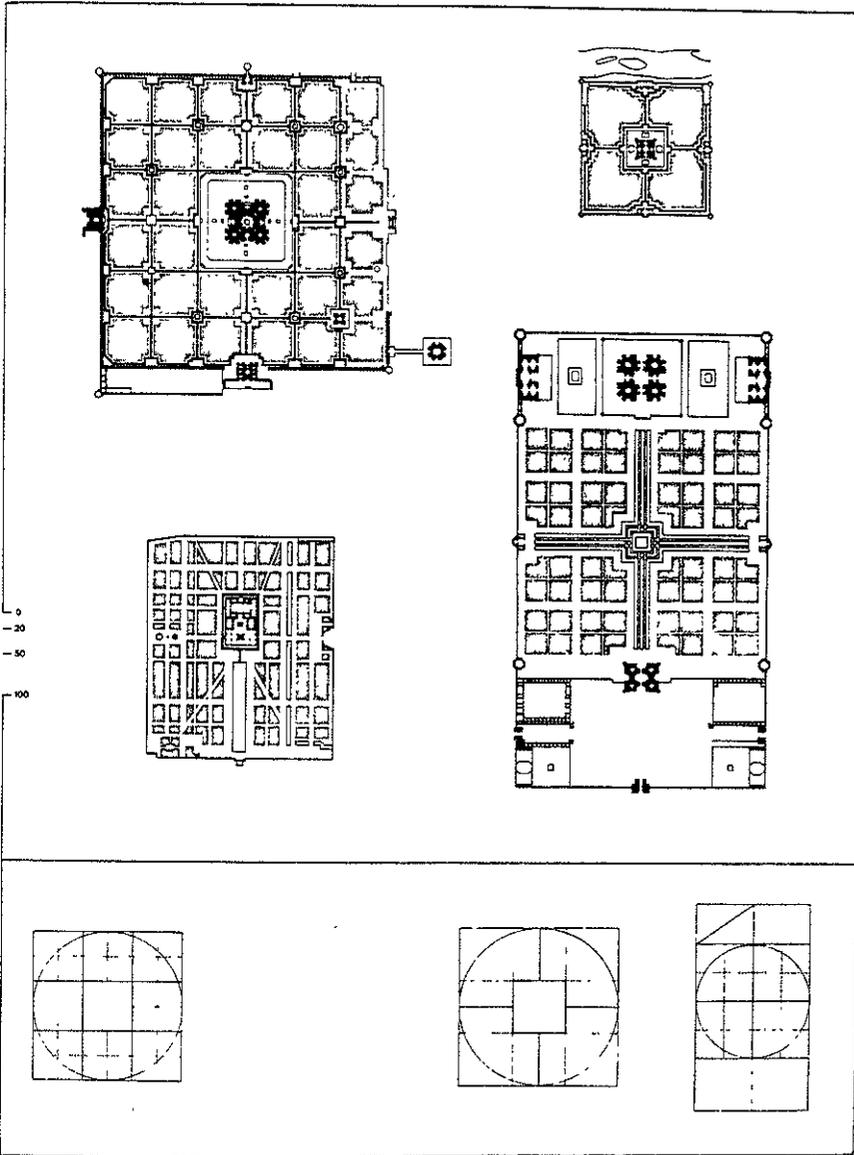
The system of gardens along the riverside, Agra. (Fig. 25).

The territorial structure between Agra and Fathpur Sikri. (Fig. 26).

Some tomb-gardens of indo-iranian tradition: above left Humayun tomb at Delhi. (Fig. 27).

Waiving any intervention in the crowded texture of the city of the Lodi, Babur assigns to the continuous design of the waterfront the need for this idea of monumentality and of representation of the new order.

We do not possess many details about the building texture of the city of Humayun and Sher Shah: we know that it developed along the north-south alignment of the Mathura road and that the citadel of Din-panah was its northern bound-



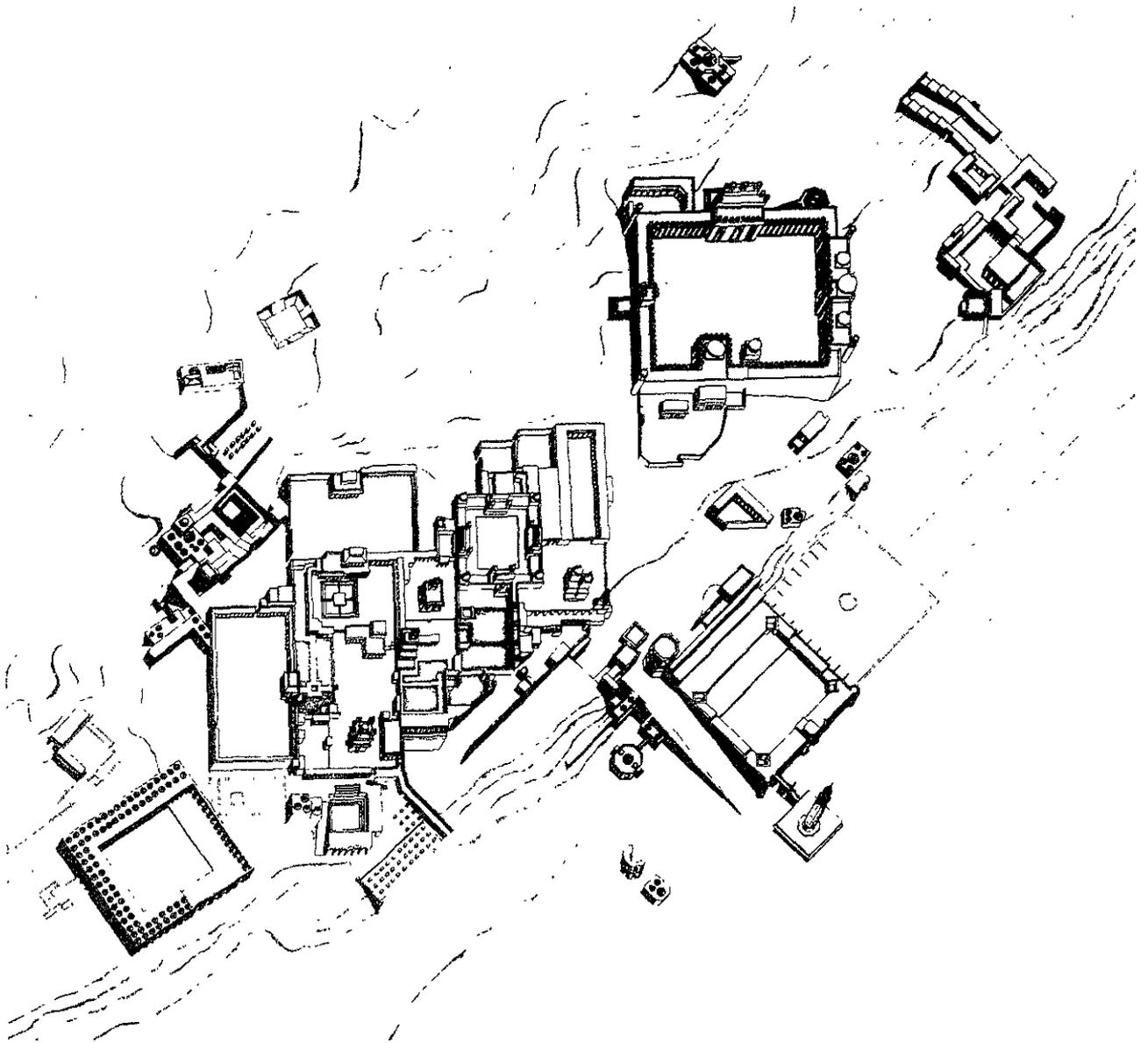
dary. Looming large over this city, which in part was built over the preceding city of Firuz Shah, is the inordinate, giant tomb of Humayun. It is clear in this case that the monument becomes the organizing element, that thanks to its orientation (following the cardinal axes) and its size — its height of 150 ft is visible throughout the city — it concentrates on itself the monumental strivings of the Moghuls. But it is not just a visual or psychological conditioning, such as we see

all buildings after this follow — starting with the many structures of the Nizam-ud Din Auliya complex — to the imperial tomb. Naturally the effect would have been far more marked if Akbar, the successor, had not decided to move the capital to Agra, drastically reducing all building activity. It might seem mere chance, but this is not so, that in both cases examined the instrument used for urban design is the garden: in the form of *Chahar Bagh* in a separate sequence, in the first case, in

the form of garden-mausoleum in the second case.

This is not the place to relate the history of the Islamic garden in India, whose evolution can in any case be read in the transition from closed to open, from static to dynamic, from non-relation with the landscape to total immersion therein. It should however be noted that the transition takes place through the transformation of use and significance of the original centripetal symmetry of the *Chahar Bagh*, regarded as a *unicum* and *monumentum*. First we witness an enlargement by summation of the original module through the use of equal modules, not hierarchically graded. Only later do organizing instruments, such as axes, joints (defined architecturally from time to time by a pavilion, a *chabutra*, a waterfall, a pool of still water, etc., or urban-scale services such as a caravanserai, etc.) and so on introduce a composition of greater scale of order. In the second half of the 16th century, the garden becomes the field of experimentation where the techniques of urban design are refined: axes and “scenography”, on the one hand; grids and proportions on the other. Something similar occurs in France under the Roi Soleil in the same period and corresponds to a general desire for the monumental which unites cultures very distant from each other: the Isfahan of Shah Abbas with the Meknes of Moulay Ismail, with Versailles.

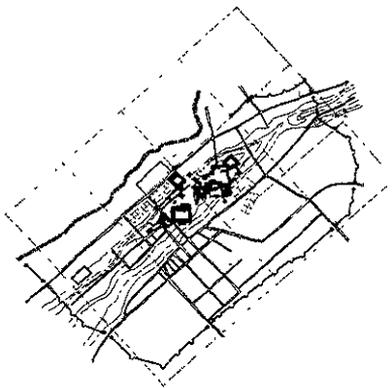
Within the framework of the process that we are examining, Fathpur Sikri represents an important turn. Despite the neglect and abandon, the sacking of the stone diggers, who have demolished many monuments piece by piece, and the ravages of time, its architecture is still a



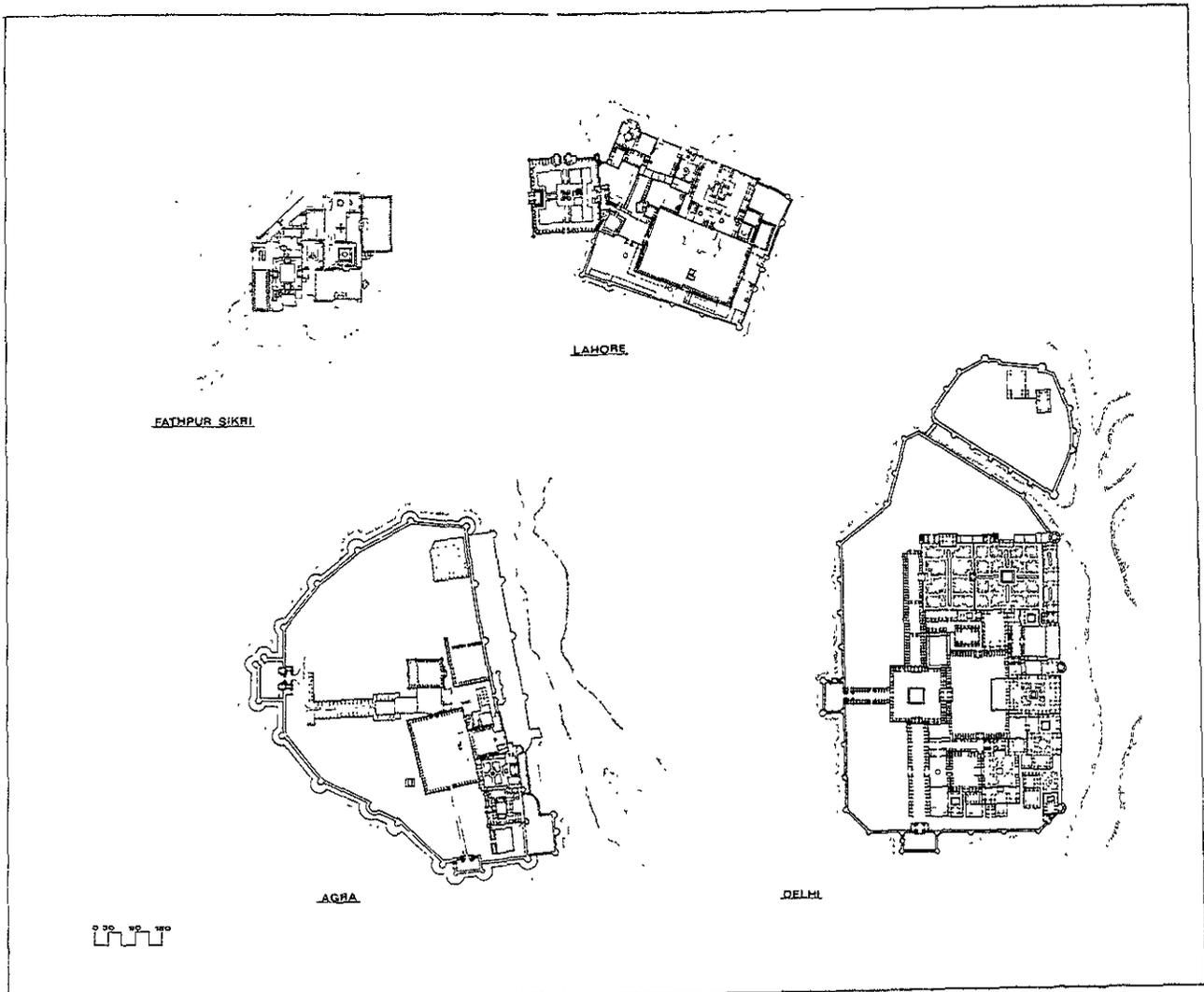
Isometric drawing of the remains of the monumental area, Fatehpur sikri. (Fig. 28).

The layout of Fatehpur Sikri is based on a maxigrid of 1000 hillahı güz. (Fig. 29).

Comparative reconstruction of the main palace complexes of the moghuls. (Fig. 30).



FATEHPUR SIKRI



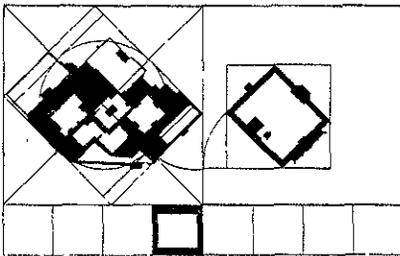
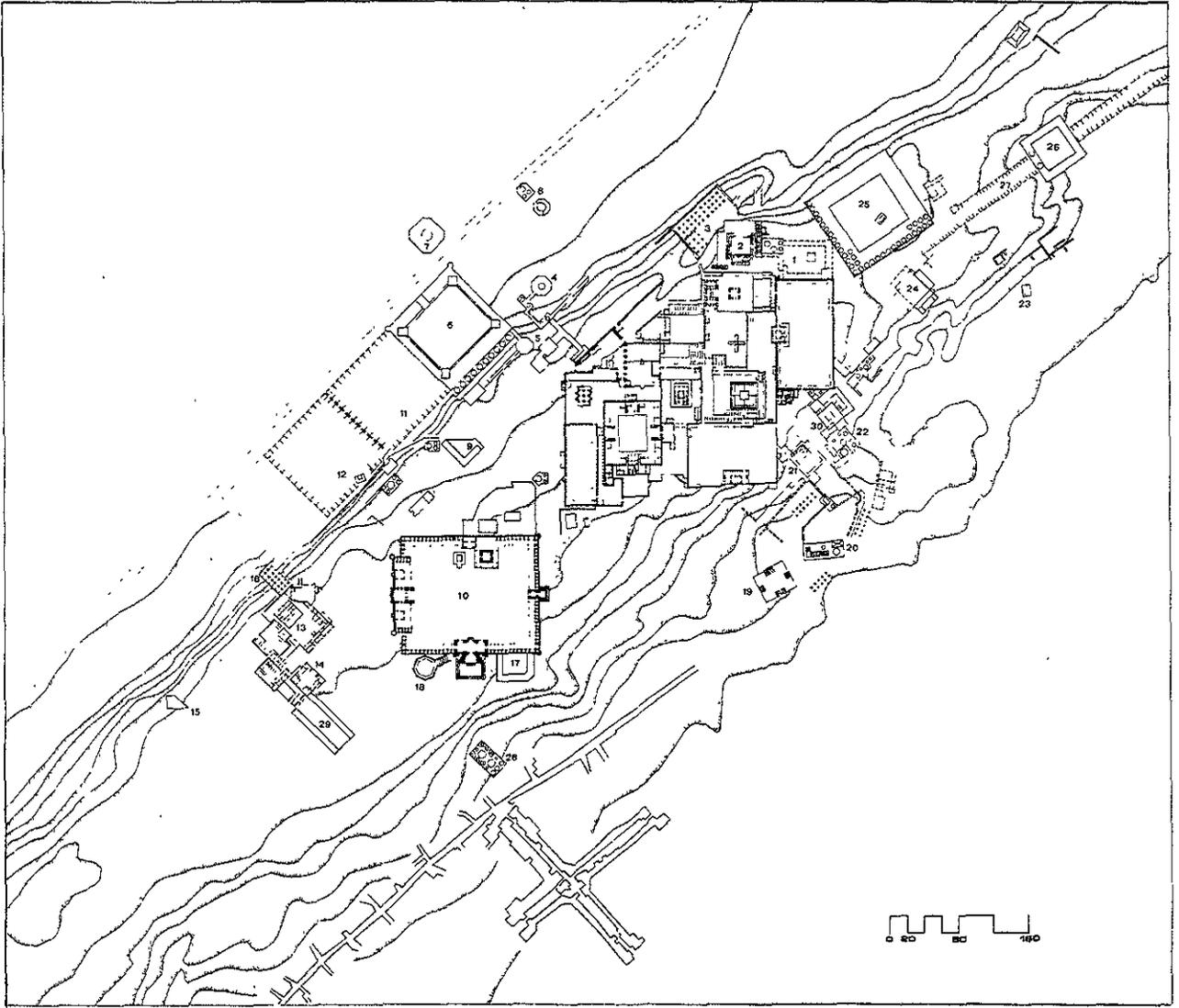
living witness to one of the most refined periods in the history of Indian culture: the reign of Akbar, the Emperor of the Moghuls. This city, designed and built within the span of half a generation, after an ephemeral life, was abandoned in favour of another famous capital, Lahore, after the political and geographic centre of the empire had shifted towards Afghanistan.

Its singular vicissitudes, dominated by the "haste" to build and provide it with all facilities, first, and to abandon it, afterwards — almost a flight — turn it into a unique case in the history of urban design, toge-

ther with very few other cases, such as the Samarra of the Abbassides. Its sudden abandonment has led to the hibernation of a page of Indo-Mohammedan history: through its buildings, some of them well preserved, we can reconstruct the events, the habits and the daily life of the sovereign and of his court. This contrary to any other city — as those who engage in urban studies are well aware — where the dynamic result of economic forces and of events, that have acted there, has caused through the centuries a stratification of building phenomena, of constant transformations and

substitutions, making it hard to see the relation between the urban phenomenon itself and the simultaneous political and social institutions.

At Fathpur Sikri the preservation of the original spaces of the period of Akbar enables us not only to reconstruct the "stage" of the daily theatrical performance of court life and the relevant scenario, but by a reverse operation to interpret many obscure passages of the *Ain i-Akbari*. Fathpur Sikri is born, in fact, as the seat of the court through an operation of urban foundation analogous to that actual-



Plan at +210 above sea level, Fathpur Sikri. (Fig. 31).

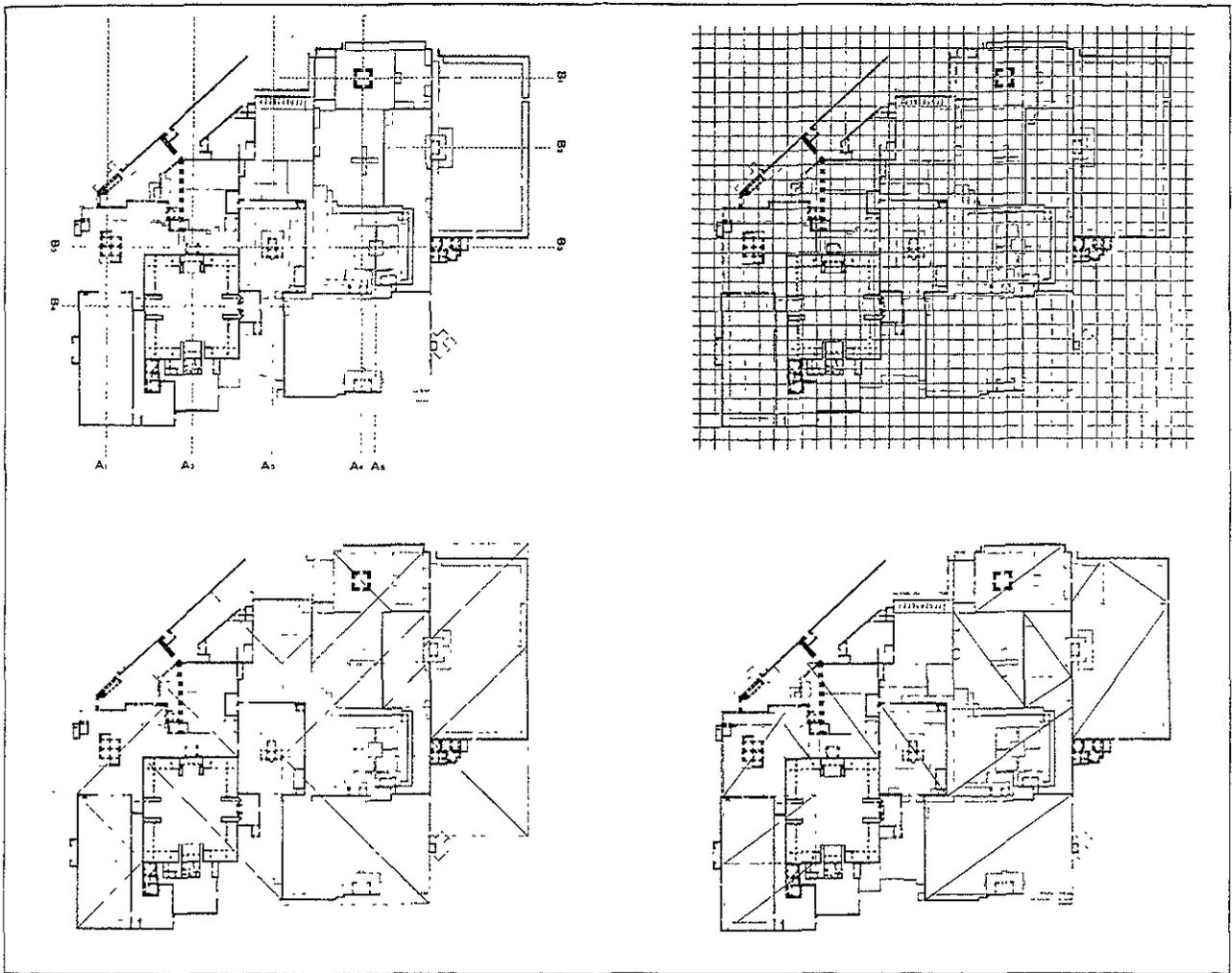
The monumental complex of the king is based on a grid of 1 tanab = 50 hillahi gáz. (Fig. 32).

The king's palace.
The geometrical control systems: above left the system of axes A and B not hierarchically ordered; above right the modular grid of 1 tanab below the series of dynamic rectangles V2 and V3 as guiding alignment of the complex. (Fig. 33).

ted the following century by the Roi Soleil in France, decentralizing the seat of the court to be able to keep the nobility under better control. It cannot in fact be excluded that Akbar, to be able to control the various clans (Rajputs, Turks, Afghans and Persians) always warring with each other, thought up the simple mechanism of uprooting them from their territories and from an economic centre such as Agra. That Fathpur Sikri is a residential city, a "gilded prison" for the court and not a needless double of Agra, is demonstrated also by the insufficiency of all military equipment. We know moreover

from the same sources that there was no real interruption between the two capitals: the road system joining them was the support for a continuous system of services.

From a morphological standpoint, we can identify the structuring aspects of the city on the ridge about 40 m in height, shaped like a rhombus, running east-west through the whole settlement, and on whose central part stands the palace and the *Jami Masjid*; the walls stretch for 9.5 km on three sides in an approximately rectangular shape, closed to the north by the large artificial lake, today partly dried up. Two strips of flattish land flank



the ridge: in the first stretch between the lake and the scarp of the uplands only two building structures remain: a caravanserai with the side toward the hill having three floors and the *Hiran Minar*. But ground structures, which in my view may be read as a continuous and compact pattern of gardens and services and facilities, and the presence of the *Chaugangah*, lead us to assume that this was an area intended for — to use a modern term — “leisure”; in the second stretch to the south, a vast area has gone back to agriculture and only a very small part is covered by the present day village, in whose very rudimentary

structures the places of the age of Akbar are preserved inset.

One novel aspect, quite certainly, is the scale of action, affecting the entire city, and the determination of the sovereign, Akbar, to control the whole design process. Not at all a whim of his architect and gesturality of form in the design of the plan! Not only, but for the first time all the “devices” tried previously are adopted systematically in a global vision:

— a decisive role is played, as Humayun’s tomb in Delhi, by the *Jami Masjid*, both from the standpoint of the orientation of the whole urban composition:

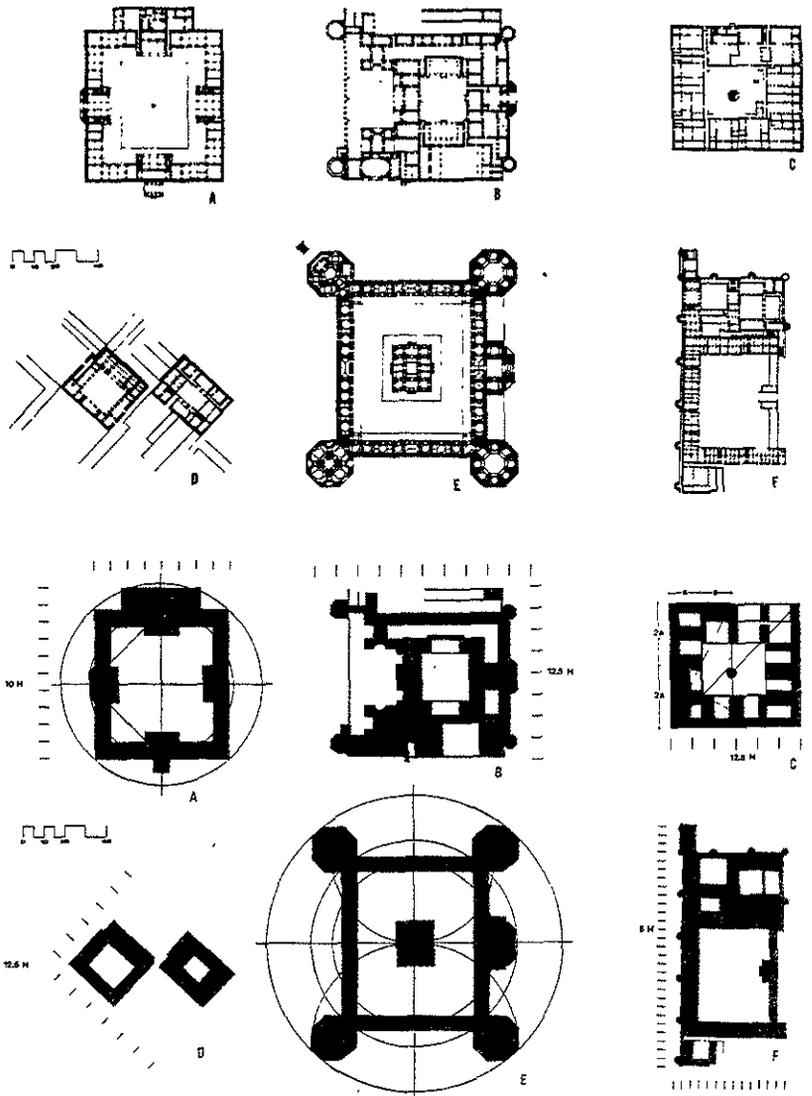
the monumental part of the palace is developed parallel thereto; and from the visual and symbolic standpoint: it rises on the highest part of the ridge at an elevation of + 45 m. In any case the other districts of the nobles also had to take account of this: the district of the west of Selim Chishti and of his family, at a rotation of 45°, and the one immediately to the north, near the houses of the Fazl brothers, this also at a rotation of 45°.

— Another preponderant element was the continuous pattern of the gardens which, northwest and southeast of the ridge, cove-

red a fair part of the flattish areas. Here the garden starts to play the role of protagonist in the urban design, even if it does not have the function of "backbone" to the whole composition, as in the long *Chahar Bagh* of Isfahan, some 40 years later.

— The use of large artificial water basins in which the built-up front of the city is mirrored, is a medieval tradition of India, boasting of examples of both Hindu and Moslem origin; suffice it to cite the cases of *Hauz Khas* in Delhi and the Rajput settlements in Rajasthan. Almost always the descent to the water has a symbolic meaning, emphasized by an adequate architectural solution: for example, the Ajmer lakeside road with the *baradari* of Shah-jahan, the Udaipur and Alwar embankments, etc. The line of the embankment at Fathpur Sikri can be partly traced on land, but it is not possible to establish whether it was a mere bank or something more monumental.

— The use of axuality, both monumental road alignments and abstract geometrical references. In both cases, however, they are not linked to bilateral symmetries and therefore they do not have that rigidity typical of the Red Fort in Delhi; they might be defined more as balancing axes than as symmetrical ones. In the first case, in fact, the main alignment of the bazaar, 800 metres long, which joined the gate of Agra with the palace, broken only in the final stretch by the *Naubat Khana*, reaches the *Diwan i-Am* with a rotation of about 35° (in the Red Fort it is perfectly in alignment and perpendicular). Studying Akbar's Palace, we find an application of the se-



Comparative metrical analysis of some moghul palaces:

- a. so called palace of Jodh Bai, Fathpur Sikri
- b. Jahangiri mahal in the Agra fort
- c. Gudfari mahal in the Fort of Gwalior
- d. Badih mahal and Rang mahal in the quarters of Selim Chishti, Fathpur Sikri.
- e. Akbar's palace, Ajmer
- f. palace of Man Singh in the fort of Gwalior. (Fig. 34).

Shahjahanabad geometrical layout based on a module of 500 hillahi gáz. (Fig. 35).

cond case: here a system of five vertical axes and four horizontal ones identifies the position of joints and volumes characterized by bilateral symmetry; but it is interesting to note that no axis prevails, creating a hierarchy of "weights". Axis A4, for instance, which structures the whole *mardana*, "threads" the so-called *Diwan i-Khass* and the *Daftar Khana*, but passes slightly tangential to Akbar's private room. The horizontal axis B3, which has a number of small buildings in a single segment and would appear to contradict what has been stated earlier, in fact "threads" volumes of only bilateral and not four-sided symmetry. The house of *Raja Birbal*, as it is called, is placed on a smaller side of the rectangular cut of the stables, in such a way that the central axis thereof is in the centre of the window of the first building; by this means two shifts are made, giving rise to

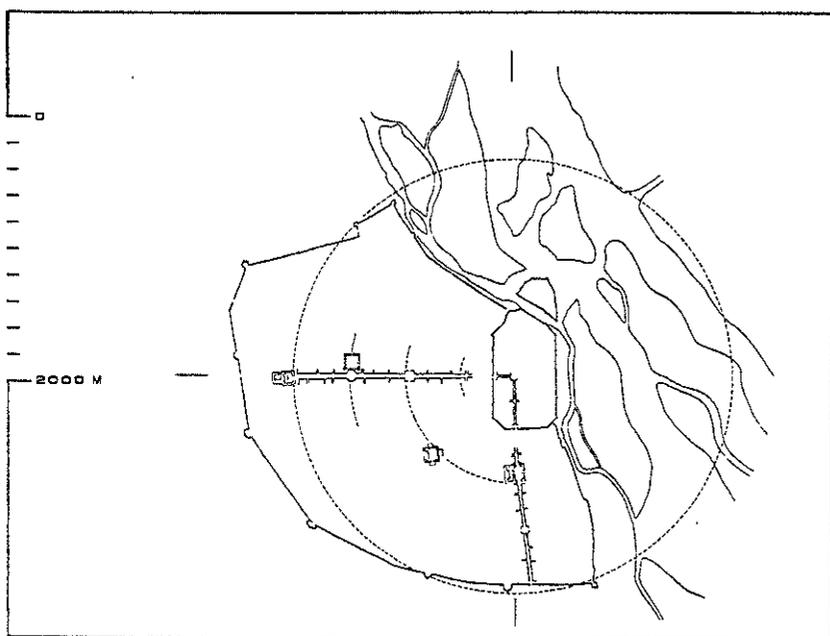
two divergent "apertures" and stressing their character as a 90° joint. We are a long shot from the placeful cross-shaped symmetry of Humayun's tomb!

— In this attempt to control the unitary form of the city, for the first time the modular grid, of casual help to the designer, becomes a systematic design instrument at all scales. The whole city, the sweep of the walls, the opening of the main gates, the road network, are based on a maxi-grid of 8 squares of 1000 *hillahi gāz* = 20 *tanab* per module; each of these in its turn, through a grid based on submodules of 500 and 250 *hillahi gāz* (40 and 20 *ban*, respectively), dimensions the districts and the main architectural structures. The middle vertical segment and the upper horizontal external one intersect on the *Hiran minar*, probably chosen for its use as "mile nought", as the starting point for the maxi-grid. I would

like to emphasize again this cosmological vision, I would say, of the "measurement" viewed as "order": it must not be forgotten that the city was inserted in a territorial framework in its turn wholly geometrized and measured through the system of *Kos minar*, even if the road network can obviously not constitute an isotropic grid like the architectural grid.

Observing the plan at a scale of 1:500 enables us to note superimposed over the articulated composition of Moghul architecture how the same module is used in analogous buildings and in the gardens of Akbar, Babur and Jahangir, then being abandoned by Shahjahan who, as known, brought about a revolution in architectural taste and in metrology. Even if the passage of the value of the *gāz* of Shahjahan from 41 to 40 *angost* may be negligible at such a large scale, it is most likely that it involved the whole metrological series and brought about the abandoning of the *ban* module.

An inquiry of this type, carried out in a more systematic way, could prove effective in solving problems of dating. Metrological criteria applied to the fort of Lahore should easily lead to the identification of the Akbar and Jahangir buildings, equally well as the stylistic characters. Leaving aside for a moment the unquestionable efficacy of the grids, a more general question arises: what conceptual value does the module or the grid stemming therefrom take on in the design? That of a simple instrument for "drawing", like a sheet of squared paper, or does the module become laden with cosmological values, as in the Hindu world where each of these even houses a divinity, or in the Islamic



world as Nasr would have it? I believe that the esoteric permeates the whole culture of the epoch and that therefore the modular system adopted at Fathpur Sikri in such a diffuse manner, tends to reflect a profound law of nature, but that it should above all be viewed under the profile of aesthetic relations. As in Vitruvio the metric principle prevails in the module and this acquires a meaning not for itself, but only as a participant in a process of *commodulatio* (and herein lies the modernity of its use at Fathpur Sikri); that is to say, it becomes itself a principle of design. Supporting this argument it should be noted that the works and the "traditional architects" possess the space "seen from inside" for a series of conventions dictated by tradition. A design traced in plan following the lines of a grid is not as to us "Cartesians" an abstract instrument of representation, but already possesses all the valencies of space. I do not think in fact that the Moghul "architect" went beyond a plan of the foundations in the graphic representation of the building.

— But in an architectural operation of the range and scope of the palace of Fathpur Sikri, the design instruments such as the modular grid and the balancing axes are revealed to be insufficient. Especially the grid, liable to conceptual expansion ad infinitum, can foster the uncontrolled growth of a complex, which by its intrinsic nature, cannot be enclosed and delimited from the exterior, with instruments that do not belong to its internal logic. A ductile, effective instrument to bring back under control the centrifugal growth of the palace spaces is the harmonic layout or guiding alignment. In this case where the

relief has prevented a composition of balanced squares and rectangles as in the Red Fort in Delhi (to the great advantage of architecture), the application of the properties of the dynamic rectangle enables the problem of the slipping of the rectangular cross section to be resolved better, keeping them tied the $\sqrt{2}$ and $\sqrt{3}$ series of rectangles were used, while for the Selim Chishti district the golden rectangle would seem to prevail.

There is no doubt that applying the same criteria of analysis at a smaller scale, similar results would assuredly be reached.

The foundation of Shahjahanabad represents a further input of the process: if we consider the nodal elements of the great Chandni Chowk thoroughfare: the Jahanara Begum Sarai, the Kotwali square, the Fathpur mosque at the very end of the segment, with the point of the compass at the other extreme of the segment, exactly in the *nakkarkhana* of the palace, and drawing a series of concentric arcs of values equal to or multiples of 500 *hillahi gāz* — the module adopted for the construction of the whole city — we find that the above mentioned nodes are found at the intersection of the roadways with the concentric circles; Jami Masjid itself comes on the second circle arc, and this could explain an otherwise anomalous position. The value of 500 h.g. is the measurement of the base side on which the Red Fort itself is built. To sum up, the Fort itself becomes the module-measure of the whole urban layout and a very rigorous albeit an abstract scheme is at the basis of the construction of the city. It is indeed quite credible that a circle of which the construction of just one quadrant has been decided should be

the reference geometrical scheme. It would not be right without clear proof to pursue the argument further, but it would be interesting to check whether in the three remaining quadrants the curvature of the circle overlies some important pre-existing building structure. A contrary argument would be that the curvature of the walls does not follow, in the western zone, the curvature of the circle; in reality, as shown also by the different design of the urban texture, in that zone there might be a later intervention or the "absorption" of an earlier village. We should note that the route of the Chandni Chowk stops in front of the Fathpur Masjid, and then takes another alignment as far as the Lahore *darwaza*. But the presence of the two great commercial thoroughfares, the city's backbone, intersecting at 90°, calls for a reflection: such a stiffening of the urban form and the introduction of bilateral axiality (although already partly present in the fort of Lahore in the sequence *Diwan i-Am* (Rang mahall and the so-called quadrangle of Jahangir) cannot be explained in the half century between Fathpur Sikri and Old Delhi unless reference is made to the Safavide Isfahan and to the almost obsessive search in Persian culture for cross-shaped or quadripartite symmetry.

The great Safavide capital is born as an extension of the existing city through the great landmark of the *Meidan*, a sort of *Diwan i-Am* dilated excessively and the pattern of the *Chahar Bagh* repeated obsessively. The garden gives its name to a grandiose avenue, a promenade flanked by 8 rows of plane trees between the river and the royal palace. It is probably by mere chance that the lengths of the Chandni Chowk and of the Chahar Bagh coincide

(about 1650 metres), but the rigid segment of the Chandni Chowk, visually and symbolically connecting the *mihrab* of the Fathpur masjid with the peacock's throne in the *Diwan i-Am*, is assuredly not by chance.

In conclusion, if Shahjahanabad in one way in 1638 represents the point of arrival of a parabola, whose vertex is Fathpur Sikri, in another way it opens up a new circle of urban design research. Bilateral symmetry and orthogonal axiality answer so well to the call for "Order" and convey so well the message of the absolutism of power, as to

decree their fortune throughout the next century. The study of the provincial capitals is still at an early stage, but in this sense it reserves some interesting surprises; I will limit myself to recalling the axial layouts of Dekkan, of Baramati, of Indapur and of the capital of Nizam, Hyderabad, and the more timid system of Alwar, the residence of a Rajput principality in Rajasthan, founded in 1771. When, in the first quarter of the century, the Maharajah Jai Singh decided to establish the new city, Jaipur, with several arcaded commercial thoroughfares intersecting at 90° in squares called

chaupar, with shops and stores on the ground floor and dwellings on the upper floors, the model cannot have been other than Old Delhi, of which he was a "faithful vassal". The *prastara* scheme of Hindu treatises, which some claim to have been the inspiration, would if anything be more an "ideological" reference than a real one. Once more metrology hurries to help out this thesis: the measurements of the urban layout in fact show 1000 h.g. as the width of a quadrant less the thickness of the main thoroughfares; and 40hg and 20hg respectively for the road sections.