Appendix (1970)

The original text of 1956 (Rome, De Luca publishers) is unchanged in this book, except that translations of Latin and Greek passages have been added. The same illustrations are used throughout. Yet it is important to add to this text information on discoveries and discussions that have taken place since the original publication. We will refer exclusively to those studies that most impinge upon Hippodamean urbanism, and it is in this context that we have chosen to review the vast and often overlapping bibliography.[1]

Our knowledge of ancient city planning has greatly increased, largely because of recent excavations and aerial surveys. The acceptance and widespread use of the rectangular plan, particularly in the cities of Magna Graecia and Sicily, is more apparent than ever. Because of the excavations of Metaponto and the studies carried out at Selinus, we must extend our chronology to include the second half of the sixth century B.C.[2] These older limiting dates again bring up the question whether it is legitimate to use the term Hippodamean to qualify these examples of urbanism. Certainly we must exclude from our discussion those

[1] Among the general discussions of rectangular city planning in the classical world, we must single out (aside from those studies concerning specific cities) the following important works: A. Kriesis, "Ancient Greek Town Building," *Acta Congressus Madvigiani* 4, Copenhagen, 1958, p. 27 (republished with several other studies in the volume by the same author, in *Greek Town Building*, Athens, 1965); A. Boethius, "Problemi connessi con l'architettura romana," *Palladio* 8, 1958, p. 1; also *The Golden House of Nero*, Ann Arbor, Mich., 1960, p. 26 and "Urbanistica," *Enciclopedia Arte Antica*, 1966, vol. 7, p. 1067; J. Ward Perkins, "The Early Development of Roman Town Planning," *Acta Congressus Madvigiani* 4, Copenhagen, 1958, p. 109; H. Rosenau, *The Ideal City*, London, 1959; E. Kirsten, "Die Entstehung der griechischen Stadt," *Arch. Anz.* 1964, c. 892. Broad discussions are to be found in the general treatises on Greek town planning, especially those of R. Martin, *L'urbanisme dans la Grèce antique*, Paris, 1956 (see also the review by A. Kriesis in *Gnomon* 29, 1957, p. 359) and those by A. Giuliano, *La città greca*, Rome, 1961, and *Urbanistica delle città greche*, Milan, 1966; A. Garcia y Bellido, *Urbanistica de las grandes ciudades del mundo antiguo*, Madrid 1966. See also M. Coppa, *Storia dell'urbanistica dalle origini all'ellenismo*, Turin, 1968; G. Schmiedt, *Atlante delle sedi umane in Italia*, II, Florence, 1970; G. A. Mansuelli, *Architettura e città*, Bologna 1970. F. Castagnoli, "La pianta di Metaponto: Ancora sull'urbanistica ippodamea," *Rend. Lincei* 14, 1959, p. 49; "Recenti ricerche sull'urbanistica ippodamea," *Arch. Class.* 15, 1963, p. 180; and "Note di architettura e di urbanistica," *Arch. Class.* 20, 1968, p. 117, and finally some articles in *Studi sulla città antica*, Bologna 1970.
It is important also to note the interesting discussions of the organizational structure of the Greek city and its limits related to the human dimension, by C. A. Doxiadis in "The Ancient Greek City and the City of the Present," *The Living Heritage of Greek Antiquity*, Paris, 1967, p. 192.

[2] An earlier date, corresponding to the founding of the city, is proposed for Metaponto, and possibly for Paestum, Selinus, and Agrigento, by A. Giuliano, *Urbanistica*. This hypothesis is further discussed by A. Di Vita, "Per l'architettura e l'urbanistica greca d'età arcaica: La stoa nel temenos del tempio C e lo sviluppo programmato di Selinunte," *Palladio* 7, 1967, p. 46. For a similar dating of Paestum, see also G. Voza, *Arch. Class.* 15, 1963, p. 232; Coppa, *Storia dell'urbanistica*; and M. T. Manni Peraino, *Parola del Passato*, 23, 1968, p. 430.

hypotheses which attribute to Hippodamus the radial plan or the monumental (scenographic) city plan.[3] The first problem is a historiographic one—to decide what Aristotle meant by διαίρεσις τῶν πόλεων. Evidently he was alluding to the widespread rectangular city plan which we know to be associated with his century and those immediately preceding it—a plan which, with some important variations, had close structural relations throughout the Greek world.

The next question is to establish the correct reference of the Aristotelian statement. Examples of Hippodamean cities like Metaponto, that certainly preceded Hippodamus, lead us to conclude with even more assurance that Hippodamus was not the creator of this type of city planning; his name is linked with it only through his studies of the political organization and the social system, and especially through his planning of Piraeus.

Hippodamean city planning is a unique chapter in the history of urban planning not only for the concept of a master plan to control all future growth and development,[4] but also for its rational organic qualities. To recapitulate, these are summarized as follows: The street grid is regularly subdivided into wide parallel strips by a very few (usually only three or four) major longitudinal arteries. At right angles to these run other streets, a few of which are major communication roads but most of which are narrow alleyways whose only purpose is to create blocks for buildings. The blocks thus formed are usually long and narrow. Buildings and plazas fall within the grid. There is no central intersection of major axes (as distinguished from the Roman axial grid). Throughout, the grid is derived from certain fixed dimensions (the short side of the block in particular was often set at 120 feet). Aside from a strictly rational and geometric form, the grid exemplified certain criteria of absolute equality among the residential blocks. If this spirit of equality was previously thought to be in keeping with the constitutional democracies of the fifth century B.C., we must now observe that by placing the more ancient plans in the sixth century we find an entirely different social system—that is, strong tyrannical governments capable of exercising total and complete planning authority. We must also keep in mind, of course, the often noted connection with colonialism.

[3] Giuliano, *Urbanistica* (especially p. 105) denies the relationship of the sixth-century colonial cities with the Hippodamean city of the fifth century B.C.
[4] The same general intent has been observed in the plan of Megara Hyblea, in the second half of the seventh century B.C. (G. Vallet and F. Villard, *Mél. Ec. Franç.* 81, 1969, p. 7). This plan is very important, particularly because it lacks the rectangular grid, thus differing from the other plans considered here.

It must be added that these conclusions may be modified by subsequent discoveries. For example, many elements basic to Hippodamean planning are to be found at the acropolis of Zernaki Tepe in Urartu, although organized on an axial scheme. If this plan can be decisively dated in the eighth century B.C., we are forced to conclude that the Hippodamean plan of the sixth century was not a spontaneous creation but rather a gradual evolution of an archaic Anatolian tradition, possibly by way of the Ionian world.

Another important point of discussion, the relation of the Hippodamean plan to the Italic and Etruscan cultures, has not been modified by new material and discoveries. Two fundamental points still hold: the theory of the celestial *templum* has no relation whatsoever to city planning; and Marzabotto is a Greek plan. Because of the limited evidence, we must still consider these to be provisional conclusions; nevertheless the Etruscans cannot be thought of as having played a completely autonomous role in the use and development of Hippodamean urbanism, nor is there evidence of the sacred nature of the Hippodamean city plan. There is even less reason to suppose a relation between the uniform grid plan of the Etruscan cities and either certain prehistoric antecedents or *Roma quadrata.*

It should not be necessary to repeat that the monotonous regularity of these plans does not mean that Hippodamean cities were esthetically unpleasing. The third dimension, the elevation is often missing; yet without doubt the differing volumes of the buildings and architectonic variation offered by the porticoes, public buildings and imposing temples would ensure a freedom of architectural solutions despite the restrictions of the plan. Often, as at Paestum and Agrigento, the temples were oriented independently of the grid, for religious reasons. Certainly the uniformity and repetitiveness of the basic grid did not prevent the planners from exploiting the natural terrain, as at Rhodes, Priene, and Soluntum.

There follows from this general discussion a series of notes and observations on problems considered in the body of the book.

p. 10. Cities of the sixth and fifth centuries, B.C.

The plan of the acropolis of Selinus must be classified separately from those of the rectangular axial intersection type. Excavations in the last few years have shown that the plan is not derived from an axial intersection to which the grid of the blocks was added during the fourth century, but rather from a plan developed at one time. It is best interpreted as comprising two

east–west πλατεῖαι and one running north–south. The short sides of the blocks were established on the former, and the blocks were divided north–south by narrow στενωποί. Only in the northern sector were the στενωποί laid out east–west because of the narrowing of the hill and the obvious space restrictions resulting. Selinus therefore is of the Hippodamean *per strigas* type, laid out in accordance with the topographic limitations.[5] The plan should be placed toward the second half of the sixth century.[6]

The archaic streets would appear to coincide with the grid system developed during the fifth century B.C.[7] p. 12. Miletus

The rectangular layout of Rhodes was also observed by J. Bradford, working from an aerial survey,[8] at the same time as J. Kondis observed it, but independently. The latter, in a new study of the plan,[9] maintains that the city was built up by small blocks 100 by 150 feet, ascertained principally by the remaining streets and discovery of ancient elements, mainly sewers. But it seems possible that certain of the sewers belong to the internal *ambitus* of the blocks. I have therefore put forward the hypothesis that Rhodes should be reconsidered on the basis of larger blocks, with the long axis running north–south.[10] From excavations in recent years we can deduce that this was indeed the direction of the long axis of the blocks; as for the dimensions, the short side of the blocks has now been confirmed at about 49 meters.[11] p. 14. Rhodes

In the documentation of this plan by Diodorus (XII, 10, 7) Kondis[12] interprets the much disputed passage (τῶν ὑπὸ δὲ τούτων p. 18. Thurii

[5] See F. Castagnoli, *Arch. Class.* 15, 1963, p. 184; A. Di Vita "Per l'architettura," p. 41. According to Kriesis, *Greek Town Building*, p. 69, we have instead an axial plan probably of Etruscan influence. According to Martin, *L'urbanisme*, p. 89, the uniformity of the plan is only apparent, being actually the product of a slow evolution.

[6] I. Bovio Marconi, "Scavi a Selinunte," in *Urbanistica* March 1958, p. 76. Also see *VII Cong. Intern. Arch. Class.* II, Rome 1961, p. 11, A. Di Vita, in "Per l'architettura." For a discussion of Olbia, see also C. M. Danoff, in Pauly–Wissowa *Realencyclopaedie*, suppl. 8, 1962, c. 1092.

[7] *Amer. Journ. Arch.* 65, 1961, p. 47; and 67, 1963, p. 185.

[8] J. Bradford, *Ancient Landscapes*, London 1956, p. 277 (with bibliography).

[9] J. Kondis, "Zum antiken Stadtbauplan von Rhodos," *Athen. Mitt.* 73, 1958, p. 146. Of particular interest are Kondis's findings in regard to the width of some of the πλατεῖαι, as much as 9.30 and 16.10 meters, and the continuity of the grid even in the hilly region.

[10] See F. Castagnoli, *Arch. Class.* 15, 1963, p. 183. For Rhodes and Hippodamus see also n. 33, p. 135.

[11] Gr. Konstantinopoulos, Ἀρχ. Δελτ. 22, 1967, part 2 (published 1969), p. 514.

[12] I. D. Kondis, Ἡ διαίρεσις τῶν Θουρίων in Ἀρχ. Ἐφημ., 1956 (published 1959), p. 106, 216. For an interpretation of the plan layout of Thurii, see also C. H. Kraeling, *Ptolemais*, Chicago, 1962, p. 48. Also an excellent aerial photograph of Euesperides has been published by R. C. Bond and J. M. Swales, *Lybia Antiqua* II, 1965, Table 39.

στενωπῶν πεπληρωμένων τὰς οἰκίας ἡ πόλις ἐφαίνετο καλῶς πεπλερωμένων) in a new way. He nonetheless arrives at the usual interpretation concerning the counterposition between πλατεῖαι and στενωποί and in attributing to Thurii a plan analogous to that of Rhodes.

p. 19. Agrigento

The Olympieion (480–460 B.C.) has been to date the *ante quem* reference for the entire plan of Agrigentum, yet recent stratigraphic excavations in the Hellenistic quarters have revealed structures datable to the second half of the sixth century.[13]

pp. 24, 35

We must take note of discussions concerning the plans of Naples and of Pompeii and of their chronology.[14]

p. 39. Paestum

The plan layout of the city[15] must be placed at an earlier date. A more ancient *terminus ante quem* than those so far considered is found in the subterranean temple[16] datable shortly after 510 B.C. Recent exploratory excavations within the residential sectors indicate a similar period.

Paestum is to be considered a clear example of Hippodamean urbanism as characterized by the elongated proportions of the blocks and notable absence of an axial intersection. Yet there has been no lack of opposing evaluations: thus von Gerkan[17] transposes the dates into the Lucanian era, and Schläger reaches similar conclusions.[18] Paestum, based on a strong axial scheme, is thus typically Italic according to von Gerkan.

[13] See E. De Miro, "Il quartiere ellenistico romano di Agrigento " *Mem. Linc.* 8, 12, 1957, p. 138. See also R. Martin, *L'urbanism*, p. 89. The aerial photographs which revealed the plan of Agrigento have been republished with a new interpretation by G. Schmiedt and P. Griffo, "Agrigento antica dalle fotografie aeree e dai recenti scavi," *Universo*, 1958, p. 289.

[14] For Pompeii, see P. Ciprotti, *Studia et documenta historiae et iuris* 23, 1957, p. 331, and M. Napoli, *Napoli Greco-romana*, Naples, 1959, p. 89. O. Elie, in *Studi sulla città antica*, Bologna 1970, p. 183; H. Eschebach, *Die Städtebauliche Entwicklung des antiken Pompeji* (Röm. Mitt., 17. E.), 1970. For Naples, see M. Napoli, *op. cit.*, p. 75, 80; C. Di Seta, *Cartografia della città di Napoli*, Naples, 1959, p. 96; W. Johannowsky, *Boll. d'Arte* 45, 1960, p. 210; G. Russo, *Edilizia a Napoli dalle origini sino al 1870*, Naples, 1961; F. Castagnoli, *Arch. Class.* 15, 1963, p. 186; P. G. Hamberg, "Vitruvius, Fra Giocondo and the City Plan of Naples," in *Acta Arch.* 36, 1965, p. 105 (interesting in particular for the terminology relating to the streets and for a study of the Vitruvian urbanistic practices of the Renaissance); W. Döpp, *Die Altstadt Neapels, Entwicklung und Struktur*, Marburg, 1968.

[15] To consult the aerial photographs from which the city plan was reconstructed, see also J. Bradford, *Ancient Landscapes*, London, 1957, p. 218, Fig. 52; W. Müller, "Der wiedergefundene Plan der Städte der antiken Welt in der aerofotografischen Dokumentation," *Wiss. Zeitschr. d. Hochschule f. Architektur u. Bauwesen*, Weimar 9, 1962, H. 3.

[16] See also F. Castagnoli, *Arch. Class.* 15, 1963, p. 188.

[17] A. von Gerkan, "Zur Stadtlage von Paestum," in *Studii Calderini Paribeni* 3, Milano 1956, p. 211. See also A. Boethius, *Golden House*, p. 36, n. 13; M. W. Frederiksen, *Gnomon* 34, 1962, p. 296.

[18] H. Schläger, *Röm. Mitt.* 72, 1962, p. 188. See also F. Castagnoli, *Arch. Class.* 15, 1963, p. 187 (concerning also the hypothesis of a road between Porta

The methodical excavations that have been undertaken enrich our understanding of this plan, important to the study of ancient urbanism.[19] The most notable of the recent finds are the discovery that the sacred buildings (acropolis) are perfectly aligned with the urban grid pattern, and the finding of a stone plate under the road surface at the intersection of two πλατεῖαι on which were incised two orthogonal lines. Although other such plates, without incisions, have been found at other intersections, it is improbable that they were part of a sacred ritual belonging to the celestial *templum* of the *Etrusca disciplina.* In all probability they were part of the normal technical operations performed during the layout of the streets. I therefore maintain that Marzabotto is to be placed among the examples of Greek urban design.

Additional examples of Hippodamean cities of the sixth and fifth centuries can now be cited.

The vast city of Metaponto[20] is built with a rectangular layout based on a few πλατεῖαι intersected perpendicularly by two πλατεῖαι and numerous στενωποί, The blocks measure one actus by one stadius (as at Naples). The temple of Apollo Lykeios serves as an *ante quem* reference, insofar as its congruity with the grid pattern presupposes at least the prior existence of the street grid. The present temple is datable toward the beginning of the fifth century, but recently a more ancient lower temple has been discovered.

The subdivision *per strigas* with elongated blocks (whose short sides are 34.25, 34.40, and 34.90 meters, and long sides about 78 meters, although the intersections are not perfectly orthogonal)

Aurea and Porta Giustizia, parallel to the temples and in existence prior to the urban grid); *ibid.* 20, 1968, p. 122. For the passage from Strabo, see M. Mello, "Strabone V, 14, 13 e le origini di Poseidone," *Parola del Passato* 22, 1967, p. 401.

[19] See G. A. Mansuelli, *Arte antica e moderna* 17, 1962, p. 14, *Röm. Mitt.* 70, 1963, p. 44; *Parola del Passato* 20, 1965, p. 314, 325; *Studi storichi* 8, 1967, p. 5. See also F. Castagnoli, *Arcd. Class.* 20, 1968, p. 119. For the stones found at street intersections, comparison should be made with the pillar found at Cividale (Forum Iulii) incised with axial lines, which was recovered from below the street level; see L. Bosio, "Lapis in capite decussatus," *Memorie Storiche Forogiuliesi* 46, 1965, p. 5. Very likely this pillar also had a purely technical function.

[20] J. Bradford, *Ancient Landscapes*, p. 225; photographs and subsequent interpretations have been published by F. Castagnoli, "La Pianta di Metaponto," *Rend. Linc.* series 8, 14, 1959, p. 49; and by G. Schmiedt and R. Chevallier, "Caulonia e Metaponto," *L'Universo*, 1959. The date I have proposed (before the beginning of the fifth century) has been changed to mid-fifth century by G. Lo Porto, *Not. scavi*, 1966, p. 139, n. 9; and by D. Adamesteanu, *Rev. Arch.*, 1967, p. 8. On the other hand, the date has been brought to the era during which Metaponto was founded by A. Giuliano, *Urbanistica*, p. 44; by M. Coppa, *Storia dell'urbanistica*, p. 1013; and by Manni Piraino, *Parola del Passato* 23, 1968, p. 430 (who places it at the end of the seventh or beginning of the sixth century at the latest).

is found at Cyrene[21] by the third quarter of the sixth century B.C.

Excavations at Imera[22] have uncovered rectangular blocks whose short sides measure 32 meters and are datable around the beginning of the fifth century.

The urban pattern of Selinus[23] (the date of which is not yet ascertainable) presents a uniform grid of about 30 x 90 meters.

The lower sector of Heraclea of Lucania,[24] founded in 433–432 B.C., follows a uniform pattern (mirrored this time also in the perimeter walls), with blocks of 55 by 175 meters, possibly subdivided again.

Excavations at Camarina[25] have singled out a rectangular block whose short side measures one actus. Its first appearance is traced to the first half of the fifth century.

Also lower Locri[26] presents a uniform grid pattern whose short sides measure one actus. We are still unable to give a date to the first establishment of the plan.[27]

p. 56. The Greek City

The characteristics of the Hippodamean city plan are not to be confused with the basic tendency toward regularity and uniformity in city planning. Some examples of this tendency were given on page 56, to which we must add that of the city of Smyrna of the seventh century.[28] Nor should the schematic subdivision of the residential sector by axes in a single direction as at Monte Casale (Casmene, end of the seventh century[29]) be considered Hippodamean. In this case we are dealing with a geometric subdivision of the terrain in an almost rigid, militaristic fashion and certainly not comparable to the Hippodamean grid. A comparison of greater value might be with the plan of the residential

[21] S. Stucchi, *Cirene 1957–1966*, Tripoli, 1967, p. 41.
[22] A. Adriani, *Kokalos* 13, 1967, p. 230 and Table 34; E. Joly, in *Himera* I, Rome 1970, p. 270.
[23] G. Schmiedt, *Kokalos* 3, 1957, p. 22.
[24] G. Schmiedt and R. Chevallier, *L'Universo*, 1959; L. Quilici, *Siris-Heraclea* (Forma Italiae), Rome, 1967, p. 174, Fig. 331; B. Neutsch, "Herakleiastudien," *Röm. Mitt. Ergh.* 11, 1967, passim (D. Adamesteanu, *ibid.*, p. 96).
[25] See P. Pelagatti, *Boll. d'Arte*, 1962, pp. 259, 262.
[26] See F. Castagnoli, *Arch. Class.* 15, 1963, p. 191 and Table 68.
[27] We may hope for specific research for Akrai, to determine precisely the planimetric system and its chronology. See D. Adamesteanu, *Xth Congress of the International Society for Photogrammetry*, Lisbon, 1964, p. 8; P. Pelagatti, *Boll. d'Arte* 51, 1966, p. 92. For Syracuse, see M. Coppa, *Storia dell'urbanistica*, p. 901.
[28] J. M. Cook, "Old Smyrna 1948–51," *Annual Brit. Sch. Athens*, 53–54, 1958–59, p. 14; for Vroulia, see also H. Drerup, *Arch. Anz.* 1964, c. 219.
[29] A. Di Vita, "Un contributo all'urbanistica greca di Sicilia: Casmene," *Atti VII Congr. Intern. Arch. Class.* 2, Rome, 1961, p. 69, and "Per l'architettura," p. 46. A similar layout is found at Monte Bubbonia (6th century B.C.); see P. Orlandini, *Kokalos* 8, 1962, p. 86 and Table 10, 2.

sector of Enkomi[30] dating from the thirteenth century B.C., characterized by a central axis onto which open numerous streets almost at right angles to it. These streets subdivide the city into uniform rectangular blocks whose short sides measure about 100 feet. This plan, like others of the Mycenaean, Mesopotamian, and Egyptian world,[31] is an instructive example of the urbanistic expressions from which there developed the Hippodamean plan.

The recently discovered plan of the acropolis of Zernaki Tepe[32] (in the region of the Van lake in Urartu) must be added to the precedents of the Hippodamean plan. The city is reconstructed according to a grid of squares with sides of one actus, bisected by an *ambitus*; two larger streets intersecting at the center determine an axial scheme. According to available evidence, the city dates to the eighth century.

The attempt by Wycherley to attribute to Hippodamus the plan layout of Rhodes has been rather unconvincing. The reference to the epithet μετεωρολόγος (see pp. 66, 72) will not be valid in its intended sense, for the term not only means astronomer but carries with it the far greater meaning of physicist and thinker.[33]

p. 66. Hippodamus of Miletus

The conception of the Italic and Etruscan city as being of sacral

p. 74. The Etruscan and Italic City

[30] See P. Dikaios, *Arch. Anz.* 1962, c. 3; and in *Enkomi* 3, Mainz am Rhein, 1959, Table 1.

[31] See A. Badawy, "La maison mitoyenne de plan uniforme dans l'Egypte pharaonique," *Bull. Faculty of Arts, Cairo Univ.*, 17, 1953; and "Orthogonal and Axial Town Planning in Egypt," *Zeitschr. für Ägyptische Sprache* 85, 1959, p. 1; and *A History of Egyptian Architecture*, Berkeley and Los Angeles, 1966, especially p. 37. See also J. Schmidt, "Strassen in altorientalischen Wohngebieten," *Bagdader Mitteil.* 3, 1964, p. 125. P. Lampl, *Cities and Planning in the Ancient Near East*, New York, 1968; B. Brentjes, "Zum Verhältnis von Dorf und Stadt in Altvorderasien," in *Wiss. Zeitschr. d.M. Luther Univers. Halle-Wittenberg*, 17, 1968, p. 9.

[32] See C. A. Burney and G. R. J. Lawson, *Anatolian Studies* 10, 1960, p. 177; C. Nylander, *Orientalia Suecana* 14–15, 1965–66, p. 152.

[33] R. E. Wycherley, "Hippodamus and Rhodes," *Historia* 13, 1964, p. 135. On the other hand, considering the diffusion of the Hippodamean plan as early as the sixth century B.C., we could reconsider the question of chronology from the opposite perspective. That is, we could attribute Piraeus not to the age of Pericles but to that of Themistocles, trusting to the testimony of *Schol. ad Arist. Eq.* 327 (See I. Lana "L'Utopia di Ippodamo di Mileto," extracted from *Rivista di filosofia* 40, 1949). We could perhaps even hypothesize that Hippodamus had nothing to do with Thurii; indeed, the attribution of Thurii to him is based on two arguments: a corrupted text by Hesychius σατυρικούς which was corrected by Valesius to Θουριακούς. Cultrera proposes Σαμιακούς. In fact, it is possible that there was confusion with Hippodamus of Thurii, a Pythagorean philosopher who is thought not to be the architect Hippodamus (see I. Lana, "I frammenti del Pseudo Ippodamo Pitagorico," *Rivista di filosofia* 40, 1949). It would seem that the only confirmed period of the activity of Hippodamus was that around 478 B.C. For Hippodamus himself, see also R. Martin, *Encicl. Univ. Arte* 7, 1958, c. 86; F. Castagnoli, *Encicl. Arte Antica* 4, 1961, p. 183. For Piraeus, see also C. T. Panagos, *Le Pirée*, Athens, 1968, p. 201. J. S. Boersma, *Athenian Building Policy from 561–0 to 405–4 B.C.*, Groningen 1970, p. 47, 124.

origin still enjoys undeserved respect;[34] Marzabotto, Roma quadrata,[35] and centuriation,[36] are considered examples.

p. 84. Greek Cities of the Fourth Century B.C. and of the Hellenistic Era

The popularity and widespread use enjoyed by the Hippodamean city plan after the fifth century is documented by many new studies. Many such cities embodied important new urbanistic principles, although we shall cite only the works concerning Cnidos,[37] Soluntum[38] (excavations have brought to light data that confirm its fourth-century origins), Tindari,[39] Lipari,[40] Alexandria,[41] and the Seleucid cities in Syria.[42] We must also consider cities such as Ephesus[43] (blocks of 140 by 140 or 140 by 280 feet) and Segesta[44] (of rectangular layout notwithstanding the topography) as belonging to this class, even though they have not been so considered heretofore. We further have in this category Morgantina,[45] a city of the fourth century B.C. whose blocks measure 37.50 by 62 meters; Heraclea Minoa,[46] fourth century, whose plan reveals several orthogonal elements; Caulonia,[47] fourth century, with parallel streets spaced at 55 meters; Lilybaeum,[48] perhaps of the third century B.C., with blocks of 1

[34] See for example W. Müller, *Die heilige Stadt*, Stuttgart, 1962; P. Lavedan, *Histoire de l'urbanisme: Antiquité*, 2nd ed., Paris 1966. See also the exhaustive critique by R. A. Staccioli, *Arch. Class.* 20, 1968, p. 141; R. Bloch, *Rev. Archeol.*, 1, 1967, p. 381; H. H. Scullard, *The Etruscan Cities and Rome*, London 1967, p. 75; R. Lambrechts, *Les inscriptions avec le mot 'tular' et le bornage étrusque* (Bibl. St. Etr. 4), Florence 1970, p. 81; and finally see the many writings on Marzabotto cited in note 19, p. 133.

[35] For further discussion and bibliography I refer the reader to *Arch. Class.* 16, 1964, p. 178. I maintain that Roma quadrata is a relatively late invention of the Romans, for they imagined primitive Rome to be similar to the quadripartite cities (*quadratae*) which they founded from the fourth century on.

[36] F. Castagnoli, *Arch. Class.* 20, 1968, p. 123. For a discussion of the necropolis of Orvieto see A. Boethius, in *Classical Studies in Honour of B. L. Ullman* 1, Rome, 1964, p. 5. G. A. Mansuelli, *Studi Etr.* 37, 1970, p. 3. According to M. Pallottino, *Studi Etr.* 30, 1962, p. 181, the ordering of certain segments of the necropolis of Cerveteri reflects the influences of Hippodamean planning practices.

[37] M. J. Mellink, *Amer. J. Arch.* 72, 1968, p. 137, Table 59.

[38] See V. Tusa, *Kokalos* 3, 1957, p. 80; 4, 1958, p. 154. A revised city plan appears in *Fasti Arch.* 14, 1959, Table A.

[39] F. Barreca, "Tindari dal 345 al 317 A.C.," in *Kokalos* 4, 1958, p. 145. It is in this context that we must place the city of Alesa because of clearly rectangular plan elements. See G. Carettoni, *Not. Scavi.* 1959, p. 294.

[40] L. Bernabò Brea, "Lipari in the IV Century B.C.," *Kokalos* 4, 1958, p. 119.

[41] A. Adriani, *Repertorio d'Arte dell'Egitto greco–romano*, Series C, I–II, Palermo, 1966, p. 22.

[42] J. Lauffray "L'urbanisme antique en proche Orient," *Acta Congressus Madvigiani* 4, Copenhagen 1958, p. 7. G. and J.-Ch. Balty, in *Apamée de Syrie*, Brussels 1969, p. 33.

[43] A. Bammer, *Oesterr. Jahresh.* 46, 1961, p. 136.

[44] V. Tusa, *Atti VII Congr. Int. Arch. Class.* 2, Rome, 1961, p. 40.

[45] R. Stillwell, *Amer. J. Arch.* 71, 1967, p. 246.

[46] G. Schmiedt, *Kokalos* 3, 1957, p. 25; E. De Miro, *Kokalos* 12, 1966, p. 221.

[47] G. Schmiedt and R. Chevallier, *L'Universo*, 1959; F. Castagnoli, *Arch. Class.* 15, 1963, p. 195.

[48] G. Schmiedt, *Kokalos* 9, 1963, p. 49.

by 3 and 1 by 4 actus; Utica;[49] Ptolemais,[50] from the second half of the third century B.C., with four πλατεῖαι transversed at right angles by two πλατεῖαι and numerous στενωποί to form blocks generally measuring 36 by 180 meters; and finally Seleucia on the Tigris,[51] characterized by an agglomeration around a central axis with an offset agora. The blocks are 144.70 by 72.35 meters, about 4 by 2 actus.

p. 96. Roman Cities

Among the Roman cities of Hippodamean plan with elongated blocks we can include the following: Teano,[52] roads spaced at 39 by 59 meters, datable toward the end of the fourth century B.C.; Volsini,[53] perhaps from the middle of the third century, with some blocks of 2 by 4 actus, others slightly more than 3 by 2 actus; Ferento[54] from approximately the same period as Volsini, with blocks of 35 by 55 meters; Graviscae[55] from 181 B.C., with blocks of 100 feet by 2 actus; Telesia[56] of the Sillian era, with blocks of 1 actus by 300 feet.

The abundant research and studies[57] concerning those Roman cities based on the intersection of two major axes (with quasi-

[49] A. Lézine, *Carthage. Utique*, Paris 1968, p. 82. Utica dates from the first century B.C., but the plan must be attributed to the third century (see *Kokalos* 9, p. 187), and the same conclusion is proposed for the plan of Carthage.
[50] C. H. Kraeling, *Ptolemais*, Chicago, 1962, p. 37. We are not sure whether to attribute to this era the plan of Tauchira in Cyrenaica (*ibid.* p. 43). This city presents a rectangular layout following a strong median axis, with blocks of 38 by 71 or 39.5 by 83 meters.
[51] G. Gullini, "Un contributo alla storia dell'urbanistica: Seleucia sul Tigri," *Mesopotamia* 2, 1967, p. 135. For the cities of the Chersoneso see the bibliography included in the contribution of C. M. Danoff, Pauly–Wissowa, *Realencyclopaedie*, Suppl. 9, 1962, c. 1104; E. Belin de Bellu, *Histoire des colonies grecques du littoral nord de la Mer Noire*, Leiden, 1965. An approximation inspired by the Hippodamean plan is to be seen in the layout of Seuthopolis, Thrace, founded at the end of the fourth century B.C.; see also D. P. Dimitrov, *Atti VII Congr. Int. Arch. Class.* 1, Rome, 1961, p. 379; C. M. Danoff, Pauly–Wissowa, *Realencyclopaedie*, Suppl. 9, 1962, c. 1370. Any influx or influence of the Hippodamean plan in Numantia is strongly negated by A. Balil, *Rev. Arch.* 1962, p. 211.
[52] W. Johannowsky, *Boll. d'Arte* 31, 1963, p. 131.
[53] A. Fioravanti, *St. Etr.* 31, 1963, Table 2; M. L. Rinaldi, *Studi Romagnoli* 13, 1964, p. 105; C. F. Giuliani, "Bolsena e Ferento," *Quaderni dell'Istituto di Topografia Antica dell'Università* di Roma 2, Rome, 1966, p. 61.
[54] Giuliani, "Bolsena e Ferento."
[55] L. Quilici, "Graviscae," *Quaderni Ist. Top. Ant.* 4, 1968, p. 107. About the plan of Faleri Novi, see J. Ward Perkins, *Papers Brit. Sch. Rome*, 25, 1957, p. 156. For Alba Fucens, see J. Mertens, *Atti VII Congr. Int. Arch. Class.* 2, Rome 1961, p. 283; and by the same author, *Alba Fucens I*, Brussels, 1969. According to Martens, the present plan dates only partly from the time of the founding of the colony. As for the plan of Carthage, it should perhaps be removed from the frame of Roman planning (see note 49 above).
[56] L. Quilici, "Telesia," *Quaderni Ist. Top. Ant.* 2, 1966, p. 85.
[57] The following citations are limited to research of a general nature: G. A. Mansuelli, "L'urbanistica della regione VIII," *Atti VII Congr. Int. Arch. Class.* 2, 1961, p. 325; and "Osservazioni sull'urbanistica antica della Cisalpina," *Gli archeologi italiani in onore di A. Maiuri*, Cava dei Tirreni, 1965, p. 225. L. Harmand, "Le rempart urbain dans les provinces occidentales," *Atti VII*

square blocks) which mark the imposition of a new Roman order and give rise to important and varied city plans will require a new synthesis and ordering to account for the chronology and the geographic setting.

Congr. 3, p. 195. I would also like to include several studies on particular cities as published in the *Quaderni dell'Istituto di Topografia Antica dell'Università di Roma* 1, Rome, 1964, as follows: C. F. Giuliani, on Aquino, p. 41; A. La Regina, on Venafro, p. 55, and on Peltuinum, p. 69. In Volume 2, 1966, see C. F. Giuliani on Fondi, p. 71; A. La Regina on Sulmona, p. 107. Regarding Aquileia, see also L. Bertacchi, *Not Scavi* 1965, Suppl. p. 1.

Aside from the works cited in *Conclusion*, we should also mention M. Beresford, *New Towns of the Middle Ages*, London 1967. For discussion and a bibliography on the grid plan cities of China beginning in the sixth century B.C., see J. Tyrwhitt, "The City of Ch'ang-an," *The Town Planning Review* 39, 1968, p. 21. It is noteworthy that in China we find the same rigorous criteria of orthogonal subdivision applied to the layout of the fields as well as to the towns (see also F. Castagnoli, *Le ricerche sui resti della centuriazione*, Roma 1958, p. 30). Such observations may help clarify and interpret similar phenomena occurring in the Greek world. See A. Wasowicz, "Plan miasta i plan zaplecza rolniczego kolonii greckiej," *Kwartalnik Historii Kultury Materialne* 15, 1967j, p. 743; *Atti del Settimo Convegno di studi sulla Magna Grecia*, Naples 1968, p. 195.