The foundation, planning and building of new towns in the 13th and 14th centuries in Europe: an architectural-historical research into urban form and its creation

Boerefijn, W.N.A.

Citation for published version (APA):
Boerefijn, W. N. A. (2010). The foundation, planning and building of new towns in the 13th and 14th centuries in Europe: an architectural-historical research into urban form and its creation

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: http://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
PART III: HISTORIOGRAPHY

Part III of this dissertation (ch.10 and 11) deals with the way the town building of the 11th to 14th centuries has been treated in the historiography of town building in the past 150 years or so. For these chapters material from different parts of Europe is used. In chapter 10 the European new town foundations of the high-period of town foundation are placed within a wider temporal and geographical perspective. Finally, chapter 11 goes into the traditional perception of the form and formation of the ‘medieval town’, the question why that perception does not correspond with the material treated in this study, and how this conflict could be solved.

10 THE NEW TOWNS OF THE 13TH-14TH CENTURIES WITHIN THE GENERAL HISTORY OF TOWN PLANNING

In the previous chapters many newly created towns have been encountered. Many of these have plans with a more or less regular orthogonal layout, and generally they appear to get more regular as the towns were created later.1 In order to try and get a better understanding of this development, the present chapter is devoted to the newly founded towns of the 13th and 14th centuries within the larger perspective of the history of town planning. The focus will be particularly on the period of about the 9th to 16th centuries, mainly with regard to questions related to the development and spread of the orthogonal town plan in this period.

10.1 New town planning in previous eras

In the fourth millennium B.C. the first cities were created in Mesopotamia.2 A concentration of power and a high level of organisation made it possible to concentrate various functions in one place where many people lived, fed by the surpluses that were imported from the surrounding area.3 These first cities were not yet completely newly created, as would often happen later on.4

Traditionally, the Greek philosopher Hippodamus of Miletus (5th c. B.C.) is regarded as the first town planner and ‘inventor’ of the orthogonal urban layout. Aristotle called him ‘the father of city planning’, and until well in the 20th century he was indeed regarded as such.5 This is, however, only partly justified. The Hippodamian plan that was named after him, is an orthogonal urban layout with more or less square street blocks. Archaeological finds have demonstrated, however, that Hippodamus cannot truly have been the inventor of this layout.6 The oldest towns and cities that had a planned layout with largely orthogonal plans were built in ancient Egypt from around the early third millennium onwards. It regards among others the royal residence Memphis. Traces have also been found of settlements that were built to settle the labourers that built new cities or pyramids. These settlements are even more regular in layout than are the new towns and cities.7 (fig.10.1) In roughly the same period, new cities with regular planned structures were also built in the Indus valley in northern India. Among others Mohenjo-Daro, Harappa and Lothal were built there between 2500 and 1900 B.C.8 (fig.10.2) Other early planned cities were for instance the ceremonial imperial capitals in China from the second millennium B.C.9; royal residences in Mesopotamia and Assyria dating back to the early

---

1 I have given relatively much attention to the plans that clearly show regularity. This is because this study is about town planning: since there are so little written sources, the urban form often is the main source on the early history of towns (apart from the still largely unexploited archaeological sources), and it is mainly in the regularity of urban form that spatial planning can be recognised.
2 Jericho, Byblos, Eridu, Uruk and Çatal Höyük are among the oldest known cities. (Egli 1959, p.78; Mumford 1961, pp.6-35; Kolb 1984, pp.18-20)
4 Morris 1972, p.9.
5 Aristoteles, Politica II, 1265b; VII, 1330b.
6 Mumford 1961, p.191; Pierotti 1972, p.236; Kolb 1984, p.115; Kostof 1991, p.145. Among others Gantner (1928, p.65) already acknowledged this quite early, but many later authors still held on to the old idea, mainly because it was so attractively simple.
7 Egli 1959, pp.33-47; Morris 1972, pp.13-14; Benevolo 1961, pp.49-53, fig.97; Kolb 1984, pp.38-40. Up to the present day it is common that such quickly-built temporary settlements for workmen or soldiers were much more regularly structured than real towns and cities.
8 Fischer, Jansen & Pieper 1987, pp.106-138; Possehl 1982, passim; Morris 1972, pp.14-18. The largest of these cities probably contained no less than 35,000 inhabitants.
first millennium B.C. at least; and ceremonial centres that were created in Central America since about the second century A.D.10

In the late second millennium B.C. the culture of ancient Greece took shape under the influence of various cultures in Egypt and the eastern Mediterranean. Since around the late 8th century, Greek city-states founded colonies along the coast of the Mediterranean, which were centred on newly created towns and cities with more or less regular orthogonal plans.11 Gradually, the new layouts became more regular.12 After the city of Miletus was destroyed by the Persians in 494 B.C., it was rebuilt in a regular form that according to tradition was determined by the ideas of the Hippodamus of Miletus.13 (fig.10.3) Regular orthogonal plans particularly appear to have been laid out for new colonial cities and cities that were rebuilt in a short period of time after destruction.14

The ancient Romans also employed regular orthogonal structures to mould their colonies on.15 (fig.10.5) They probably were inspired by Greek and Hellenic examples, as well as by regularly planned cities that were built by the Etruscans in Italy.16 (fig.10.4) Hundreds of towns and cities were built by the Romans throughout their empire. In fact, many of the towns and cities that revived in Europe around the 9th to 12th centuries had a past as a Roman colonial settlement.17

---

11 An early Greek colonial city with very regular, but non-orthogonal, form is Megara Hyblaea on Sicily, which was founded in 728 B.C. Around 700 B.C., colonial Smyrna was built on a plan that was orthogonal but not very regular. (Borghmans 1993, pp.109-110)
13 Hippodamus is also reported to have played an important role in the (re-)planning of the city Piraeus, and he is also associated to Thurii and Rhodes. It seems that the importance of Hippodamus' ideas was not so much in the orthogonal plan, but rather in the distribution of functions and social classes over the city. (Kolb 1964, pp.115-120; Cahill 2002, par.1.2)
16 Harris 1989, p.85; Borghmans 1993, pp.51-101, 128. The Etruscans were, in their turn, probably also influenced by Greek and Hellenic culture.
The development of Greek and Roman urbanisation is relatively well known, as there are relatively many written sources and there has been much attention for the subject since the Romans and Greeks are generally regarded as the main ancestors of modern western culture. It should not be forgotten, however, that there were also other cultures with cities, as for instance in ancient China, India, Africa and Central and North America. And in Europe there were also urban settlements in the Iron Age, primarily of Celtic origin. There were also urban centres in pre-historic times in the parts of Europe that were not conquered by the Romans, which were rooted in different cultural traditions. Among these, there are also cases that appear to have been newly planned, such as the Lusatian town of Biskupin in Poland.

After the gradual disintegration and fall of the West-Roman Empire in the 5th century, and the devastations by the invasions of Huns, Germanic peoples, Byzantines, Mores, Magyars and Normans in the next five centuries, little remained of urban culture in western and central Europe. The old economic structures largely declined, and by the late 9th century most communities were largely self-sufficient and almost completely agricultural in their economic activities.

In the 10th and 11th centuries, however, there appears to have been a general improvement in the political stability and economy. A milder climate, new agricultural inventions and a higher level of organisation helped to create a

---

18 See Egli 1962, vol.II.
19 Demandt 1998. In fact, many sites where the Romans created towns, such as Paris, Vienna and Bratislava, had previously been Celtic settlements of more or less urban character.
22 Schmiedt 1974, pp.605-607; Mumford 1961, pp.213-216; Enciclopedia dell’arte medievale 1994, Lemma Città, Vol.V, p.20. An area that was anomalous in western Europe in this respect was Islamic Spain (711-1492), where the classical urban civilisation was partly maintained under Muslim rule. The situation in more northerly parts of Europe has been designated as an ‘economy of no markets’ by Pirenne (1956, p.31), but this appears to be overstated. (see McKitterick 1995, ch.15)
growing surplus from agricultural yields. This made it possible for trade and crafts to grow and for the monetary economy and urban culture to revive.\textsuperscript{23}

Initially, urban culture recovered particularly in existing settlements, often in remnants of Roman towns and cities, but later on ever more towns were created anew. Meanwhile, the population of western Europe increased rapidly and the utilised agricultural area grew with it. The agricultural areas of existing villages were extended and new villages and towns were created in uncultivated areas as cores for new reclamations. This happened in the core of West and Central Europe, but also along the edges, in a process of outward colonisation.\textsuperscript{24}

10.2.1 On the origin of the orthogonal town plan of the high-period of town foundation

Little is known about the origin of the new movement in settlement creation.\textsuperscript{25} Probably there was not one origin, but there were several.

Various German scholars believed that Freiburg im Breisgau (1120) was the first real newly planted town in Europe since the Roman period.\textsuperscript{26} This would have formed the example, directly or indirectly, for the other town foundations of central, western, northern and eastern Europe. Some scholars even tried to reconstruct a kind of genealogy to determine the way that the one foundation influenced the next.\textsuperscript{27} This idea is based, however, on poor information on a limited number of town foundations and an over-simplified view of complex developments.\textsuperscript{28} Reality was, of course, much more complex: new town creations may have been inspired by models from neighbouring territories or from further away, indigenous traditions may have played a role and similar solutions may have been developed independently in different places.

\textsuperscript{23} See pars.0.1.2, 0.1.4.

\textsuperscript{24} Bartlett 1993, pp.5-60, 106-197; Gutkind 1964 (vol.I), pp.13-20, 63; Hall 1978, pp.16-103, see also pars.0.1, 10.3.1. For example: in 1203 margrave Henry of Moravia gave the monks of the Premonstratensian order the right to reclaim the forest of Strelna ‘and to establish villages, hamlets and towns’. (Gutkind 1964 (vol.I), p.63)

\textsuperscript{25} On early urban centres in Europe from around the 8th to 11th centuries, see Clarke & Simms 1985; Hodges & Hobley 1986; Verhulst 1996; Verhulst 1999; Jarnut & Johanek 1998.

\textsuperscript{26} On early town foundations in England, see below in this paragraph. Early foundations in Norway are Nidaros/Trondheim (997), Bergen and Oslo (c.1000), and in Sweden Sigtuna (c.980) and Lund (1019). These were all royal foundations. (Gutkind 1965, Vol.II, pp.346, 403; Tesch 2001, pp.723-735; Sandnes 1995) In Spain Burgos was founded in 884 by Alfonso III of Castile as part of the early reconquista on the Moors. (Gautier Dalché 1979, pp.27, 300-305) Early examples in Italy are Otricoli (early 9th century), Leopoli (or Centicelle, founded by pope Leo IV in 854 to protect the inhabitants of Centumcellae against Saracen incursions) and other ‘incastellamento’ towns in the 10th and 11th centuries in central Italy. (Enciclopedia dell’arte medievale 1994, Lemma Città, Vol.V, p.20; Schmiedt 1974, p.580; Guidoni 1978, p.103; Toubert 1973, passim and esp. pp.313, 327, 357, 536, 540; Chapetot & Fossier 1985, pp.113, 188) See also below, n.34.

According to Schlesinger, the original Naumburg was the first town plantation in 1033. (Schwineköper 1980, p.105, n.10) Pitz holds Geraardsbergen in Flanders for the first newly planted town in Europe that was meant to be a town right from the outset, around the year 1070. (Pitz 1991, p.178) Both original plantations were not very successful and have not left any recognisable traces of spatial planning. It may be doubted, however, whether either Schlesinger or Pitz is right, since it is quite clear that the earlier foundations in England, Italy and possibly others elsewhere, must also have been meant to be towns, although the terms used by the founders may have been different.

\textsuperscript{27} Among others: Planitz 1954, pp.112-117; Feger 1963, pp.44-47; Rüeg 1978. See also Mayer 1978. Freiburg was believed to have been founded in 1120 by Duke Berchtold III of Zähringen in association with a group of 24 traders (mercatores personati), after the example of Cologne.


With regard to the history of spatial planning of the new urban creations, much has been written about the origin of the orthogonal layout. Various scholars have tried to find an origin, but none of them came to convincing conclusions. Some believe that the origin lies in 12th-century Italy, while others seek it in Flanders in the 11th or England in the 8th century. Several of them believe that the model of Roman colonial towns or military forts was revived, whereas others think that the model of the orthogonal settlement plan may well have been newly ‘invented’ independently in different places and different periods, by planners who were searching for solutions to similar problems. An argument for the latter idea is that regular orthogonal settlement plans were, long before, also created independently in Egypt, eastern Asia, southwestern Asia and Central America. The adherents to this idea try to explain the return of the orthogonal plan from its inherent advantages: many villages and towns came into being on a road, an intersection of roads or a road and a river, which often may have provided a basic structure that favoured an orthogonal layout; furthermore, it was more or less obvious to give a planned layout a straight main street, rectangular lots and perpendicular side streets. When lots of equal size and secondary streets were made, that almost ‘naturally’ led to rectangular street blocks. Lots were most easy to set out at a specific size when they were rectangular, and this form also provided the most practical form for houses, as they generally were rectangular as well. In this trend of thought, planning almost automatically leads to more or less orthogonal layouts.

By lack of clear sources it is impossible to establish precisely when for the first time since the Roman colonial foundations more or less regular orthogonal layouts were created again for new settlements. It is obvious that

fig. 10.4: Reconstruction of part of the plan of the Etruscan town of Marzabotto in central Italy (near Bologna). Based on archaeological excavations. The dotted lines represent hypothetical reconstructions. (From: Ward-Perkins 1974) Marzabotto was founded c. 500 BC. It is quite possible that the Etruscans were inspired to build the town in this regular form with elongated street blocks by the example of the Greek colonies. It is likely that Etruscan examples like this one, together with the examples of the Greek colonial cities, inspired the Romans to lay out colonial towns on more or less similar orthogonal plans.

30 According to Keller (1979), for instance, the main source of the regular orthogonal plan in eastern Europe was Austria and ultimately northern Italy, where it was inspired by the forms of the existing towns of Roman origin. (pp.116, 125-127, 135, 142) But he also admits that in the same period there were also other areas where similar forms were created. (p.86) Hall (1978, p.126), however, holds forth that the Italian orthogonal plans of the second half of the 13th century were inspired by the French bastides. Schweincköper (1980) believes that the origins of the regular orthogonal plans that were created in Germany by the late 12th century may be found in Flanders or England. (pp.141-146, 149, 171, n.153)

31 For instance: Hamm 1932, Lang 1935, p.97; Morris 1956, pp.37, 97; Keller 1979, p.135; Johnston 1983, p.28; Iacono 1999, pp.L.21-24; Mot 1985, p.8; Higounet 1989, p.221. With respect to the terre nuove frontier: Richter (1940, p.353) Pozzana (1983, p.75) and Merlina (1983, pp.5, 6). According to Stanislawski the grid was never re-invented; it was always taken over from older cultures since its initial invention in the cities of the Indus valley in the 3rd millennium B.C. (Stanislawski 1948) Gutkind (1964, pp.111, 120) and Benevo (1980) point at the correspondence with the Roman model, but leave aside the question whether there was an actual connection between them. On the supposed influence of the Roman agrimensores literature, see below in this paragraph.

32 Gantner 1928, p.96; Gutkind 1964, p.465; Gutkind 1967, p.211; Bersonford 1975, p.160; Morris 1972, p.382; Lavedan & Hugueney 1974, pp.10-11; Franchetti Pardo 1982, p.47; Hamm 1989, pp.27-28; Higounet 1989, pp.213-219 (explicitly contradicting Keller’s hypothesis that the orthogonal plan with central market square found its origin in northern Italy); Kolb 1984, p.258 (with respect to ancient Greek orthogonal town planning). Steegh (1988, p.140) holds the rectangular outline form and orthogonal structure for an archetype that could hardly be omitted, but in his opinion it is a ‘typical of the middle ages’.

33 Among the cities that were built in Central and South America by the Aztecs, Mayas and Incas in pre-Columbian times, there are some with very regular orthogonal plans. (Egli 1962, pp.403-427; Morris 1972, pp.251-254) It is highly unlikely, that they had the same origin as European or Asian settlements with orthogonal plans. This suggests that the orthogonal structure was ‘invented’ as a good way to order settlements independently in different places. (see Castagnoli 1956 and par.10.4)

34 I explicitly write ‘more or less’ here. According to Lilley there is an essential difference between true orthogonal plans that could only be laid out with the help of a thorough
especially since the first half of the 13th century many orthogonal plans were created, and in general it can be observed that the layouts of the 13th century commonly were considerably more regular than before. However, there are also examples of fairly regular orthogonal plans of earlier centuries, as for instance Empoli (1119) and Cascina (1141) in Tuscany, which were founded by Count Guido Guerra and the bishop of Pisa. Bardolino in northern Italy, has a less regular but still orthogonal plan, and was probably already created between the late 9th and 11th century. In the 830’s, Capua in southern Italy was re-founded and moved to another location and rebuilt on an orthogonal basis by Sicone, duke of Benevento. In Flanders, Grevelingen and Nieuwpoort are towns that were founded relatively early with regular orthogonal plans (c.1160).

knowledge of geometry (which would only have been available since the second half of the 12th century) and what he calls ‘quasi rectilinear plans’, which were already created in the previous centuries. (Lilley 1998, pp.83-88) It may be doubted, however, whether this is correct: see par.10.2.2.

Empoli and Cascina: Lang 1955; Siemone & Frati 1997, p.10; Detti, Di Pietro & Fanelli 1968, p.96; Pirillo 1989, p.13. It has been claimed that Bardolino was a Longobardian creation, but that seems to be based mainly on an association of the name that has no historical basis. The place was mentioned already in 807, but only around 1100 it known to have been a settlement with urban character. (Cipriani 1984, pp.10-13)

Pane & Filangieri 1994, pp.15-36. In this case it seems well possible that the the form of the plan was inspired by the example of the ancient Roman town of Capua, from which the new town was moved away. Campobasso, in southern Italy, probably also was a Longobardian foundation from the 9th century (Zaccarello 1994, p.17), and Lanciano, in the Central Italian Abruzzo region, was probably also founded by a Longobardian duke, but only in the 11th century. (Zocca 1980, p.406) Other early town foundations in Italy with traces of regular planning are: Ferrara (Castrum Ferrariae, founded in 604 by a Byzantine lord) and Chioggia (probably 7th century) in the Estuary of the river Po, Monterotondo, founded close to Rome in the 11th century, and Cerreto d’Esi in Le Marche (first mentioned 1090). (Morini 1963, p.158, fig.6; Pallottini 1951, tav.XXX; Enciclopedia dell’arte medievale 1994, vol.V, p.20, lemma Città) In the north of Spain there were also new towns founded already in the 10th and 11th centuries, for instance Jaca, founded by King Sancho Ramírez of Andorra in 1065, which seems to have had a fairly regular plan in its early stages. (Pitz 1998, p.38f)

Still earlier examples of planned urban settlements with more or less orthogonal structures are known from England. Bury St. Edmunds probably was re-founded in the late 11th century, Saxon Hamwih (Southampton) seems to have been laid out already in the early 8th century, while Hereford was founded by King Offa of Mercia in the second half of the 8th century. In the last quarter of the 9th century, King Alfred the Great of Wessex and his successors founded various forts and fortified settlements with a more or less urban character, in answer to the threat of the Danes. Some cases regarded fortifications of existing settlements and others were new creations. These places, circa thirty in number, were designated with the term burh. Wallingford, Wareham (fig.10.8), Cricklade and Oxford had rectangular outlines and fairly regular patterns of streets and lots. Twelve other burhs had regular plans that seem to have been adapted to the topography of the hills on which they were built. Nottingham and Winchester probably also had more or less regular orthogonal layouts in the 9th century.\footnote{Biddle 1974, pp.218-225; Biddle 1976, pp.22-28; Biddle 1976 (II), pp.122-137; Aston & Bond 1976, pp.65-69; Beresford 1979, pp.195-197 (Wallingford), 199-200 (Lyddford); Brisbane 1988 (Hamwih); Statham 1998, pp.89-91 (Bury St. Edmunds). For Winchester, see below in this paragraph.}

With regard to the provenance of the regular plans in England, it has been suggested that the Danes may have provided models, but this is highly speculative.\footnote{Biddle 1976, pp.27. Archaeological excavations have shown that the 9th-century town of Haitabu (or Schleswig) in Denmark already had a more or less regular plan. (Biddle 1976, p.27) Not far from there, 9th-century extensions to Hamburg and Emden in northern Germany also had regular layouts. (Lobbedey 1977, p.140) However, these layouts do not show highly significant correspondence to the new layouts in England of the period.} Another possibility that has been suggested is that the Roman colonial cities of England acted as models. Both Winchester and Hamwih occupied sites of or near to former Roman towns. Winchester even lay within the remnants of Roman walls and its gates lay on the same spots as the Roman gates. (fig.10.9) Winchester’s street pattern, however, was largely laid out anew in the 9th century when it was re-founded by King Alfred the Great. It had a rather irregular orthogonal structure on the same basic directions as the Roman streets had had, but only the central High Street really coincided with one of the Roman main streets. Nevertheless, the orthogonality of the new structure appears to have been determined, at least partly, by the basically rectangular layout of the Roman walls and the place of the four ancient gates therein.\footnote{Biddle 1976 (II), p.122.} It seems unlikely, however, that Roman colonial towns actually formed the model after which the forms of these new towns were moulded.\footnote{Biddle 1976 (II), p.122.}

But still, the new urban culture can be regarded as successor to the colonial urban culture of the Romans in various respects. The social, political, economic and juridical situation in the new towns may have been very different from the situation in the Roman era\footnote{Pitz 1991, passim. In this respect, the situation in the towns of Western Europe contrasted with that in the Byzantine empire. In the city of Rome with all its imperial connotations, however, the great concentration of ancient civic heritage, in material as well as in ideological form, meant that the resemblance to the ancient situation remained stronger than elsewhere in the West. (Schramm 1939, s.v.)}, but many ideas on urbanity and civility had survived,
whether or not in direct connection to Christian religious ideas and the ecclesiastical organisation. As to the form of the towns: in the earlier centuries, say from the 9th to the 12th, they were mostly rather different from Roman colonial towns; but particularly in the 13th century the rectangular orthogonal plan with two main streets crossing in the centre, similar to the cardo and decumanus streets of Roman plans, became more and more widespread. Most scholars that tried to identify the origin of this regular orthogonal urban form in the high-period of town foundation, have pointed to the Roman heritage as the probable source of inspiration. Some of them suggested that actual remnants of Roman towns and military forts inspired the later town founders, but many others believed that the Roman tradition lived on through the knowledge of ancient educational literature on land measuring, architecture and the layout of the military fort.

Special prominence is attributed in this context to Roman treatises on land measuring, which were united in the so-called Corpus agrimensorum. According to many scholars, the orthogonal form of the Saxon foundations in England and the later newly planned towns all over Europe, were inspired by and made possible through the knowledge of these treatises. Zagrodzki even claims, ‘The main and nearly sole source of medieval knowledge in the field of practical application of geometry was the Roman science of surveying handed down in the writings of the gnomatics.’ This is, however, quite untrue. The manuscripts of the corpus agrimensorum were indeed preserved in monastic libraries and were copied there, and their contents were reflected on in the theoretical works of among others

---

44 It regards among others the consular system in urban administration that was revived in Italy and southern France (Pitz 1991, pp. 246–252); references to Roman citizenship in the privileges that the settlers received, for instance in the new town of Piverone in northern Italy in 1202 (Fasoli 1942, p.153); references to and comparisons with the greatness of Rome in urban panegyrics (Hyde 1965-66; Palliser 2000, pp.151, 88); Silts 1990, pp.198-199) and descriptions (Villani ed.1823, vol.1, III, 2, p.137-140). The most important channel through which knowledge of ancient urbanity had flown to the centuries under consideration, was, of course, literature. For instance in the highly authoritative encyclopaedic work of Isidore of Sevilla (early 7th century), which was largely based on ancient written sources, most entries that have to do with urbanity come from, and are explained in the context of, the Roman tradition. (Isidorus ed. 1957, s.s.) Also, in historical references it was always proudly mentioned if a town or city had a (supposed) Roman origin (in which respect there is no difference to the present day). (Duby 1980, p.59)

45 See for instance: Flint (figs.1.11-12), Caerwys (1.36-37), Aigues-Mortes (2.15), Monpazier (2.20), Grenade-sur-Garonne (2.22), Bretenoux (2.33), Sainte-Foy-la-Grande (2.21), Vianne (6.3), Pietrasanta (3.4), the terre nueve forentine (3.6-27), Leoben (5.4), Santa Fe (10.13), Elburg (7.3), Bientina (9.3), Retz (9.11), Wiener Neustadt (9.18).

46 See above, n. 31.

47 Still other scholars, however, only state that the orthogonal town plan was taken over from the Romans, without making clear how and through which channels: Gantner 1928, p.86; Stanislawski 1926, pp.117-120; Koller 1978, pp.51-52; see also Pujo 1990, p.364.


49 Knowledge on ancient military forts was provided by the classical works of Polybius (Historiae, Polybius ed.1996), Josephus (De Bellum Judaicum), Vegetius (Epitome rei militaris) and Pseudo Hyginus (De munitionibus castrorum). See Morris 1972, p.39; Sherwood 1980, pp.22-51; Polybius ed.1996.

---

400
Gerbert of Aurillac, Vincent of Beauvais and Leonardo Fibonacci. But there are no concrete indications, as far as I know, that the knowledge from these sources was actually used for surveying. In fact, the techniques needed for the laying out of orthogonal town plans generally were so simple that they certainly need not necessarily have come from these theoretical sources. It should also be considered that the centuriatio, the orthogonal structure by which the Romans ordered the fields in many colonies, was indeed treated in some of the tracts on land-measuring, but unlike what many scholars seem to assume, these texts are about the allotment and measurement of agricultural fields, but not of towns.

So, many scholars have assumed that the orthogonal town plan must in some way have been inherited from the Romans. But their assumption was hardly based on evidence; it rather seems that many of them could not believe that the orthogonal town plan could have been autonomously created in the ‘middle ages’. This problem of a preconceived view of the period of the ‘middle ages’ will be considered in more detail in chapter 11. For now, it must be acknowledged that there is, as far as I know, no evidence that the town founders and planners of the period under consideration actually knew what the typical plan form of the Roman colonial town was.

In my opinion there is not just one source of the orthogonal town plan in Europe in the post-Roman period. Early towns with more or less orthogonal plans can be found in Italy as well as in England. In some occasions, these may have been inspired by older Roman layouts, as is likely in the case of the Longobardian re-foundation of Capua in southern Italy; but the assumption that has been stated by many scholars, that the orthogonal town plan in general was inspired by knowledge of typically Roman sources, whether physical or theoretical, is unlikely to be correct. Much as, on world scale, the orthogonal plan was invented independently in the ancient Near East, China and Central America, it seems to have been created independently on different occasions in post-Roman Europe as well. After all, it is a fact that when the human mind seeks to create order on a two-dimensional plane – and the idea of order is, of course, fundamental in town planning –, the orthogonal scheme is no farfetched solution. In fact, it is the most obvious solution.

---

51 See pars.9.6.1 and 10.2.2. There can be no doubt, however, that the agrimensoris manuscripts were held in high esteem. They even were regarded as worth copying when they just described boundary stones or specific but unidentifiable pieces of land. (Dilke 1971, pp.227-230; Josephson, 1950, pp.1-72)
52 This system is often regarded as the general system of Roman land organisation; but in fact it was far from general. And when it was used, it was often less uniform as is commonly assumed: there was a considerable variation in the dimensions of the fields and blocks of fields, and in the orientation of the grid. Even when different centuriones lie right next to each other, their orientation may vary. (Dilke 1971, pp.84-87, 94-95; Müller 1961, pp.19-20)
53 Dilke 1971, p.141.
54 See above, n.31. In quite a number of cases, towns that were built on a regular orthogonal plan in the 13th and 14th centuries, have even been held for Roman foundations since about the 18th century, since it was thought that this urban structure was typically Roman and, conversely, a-typical of the ‘middle ages’. (for instance: Pennant 1783, p.77 on Bala in Wales; Durand 1919 on the biste of Saint-Denis; Mot 1963 on the biste of Carcassonne)
55 The early-14th-century Florentine chronicler Giovanni Villani is often wrongly attributed with exact knowledge of the original Roman form of his city. He certainly knew that Florence originally was a Roman colonial foundation: he described its foundation according to local myth and he also touched upon its form. In his reconstruction he was right about the grace of three out of the four gates and the location of the capitol; it remains unclear however, how he saw the outline and the street pattern of the original town plan. (Villani 1892, vol.1, pp.53-54 (cap.I, 18); Friedman 1988, pp.82-86) In the 14th century Opicusus de Canistris, wrote a laudatio on his mother town of Pavia, the plan form of which is presently regarded as a well-preserved typical Roman colonial plan structure. Opicusus clearly mentions that the plan is regular, rectangular and having two main streets in the mode of a cross, and he also writes that inscriptions at the gates claim that it is a second Rome, but nevertheless, he holds its foundation for Gallic, and strangely enough he gives more attention to the historic presence of the Longobards than of the Romans. (Opicino ed. 1995, passim, and esp. pp.8, 16, 56, 71, 120)
56 See pars.9.6.1, 10.4. It should be reminded that, wherever the regular orthogonal plan came from, by the 13th and 14th centuries the regularity and order of the straight street and the grid had also acquired overtones of a symbolic nature. (see pars.6.4, 8.5.1, 8.6)
In the present context it should be considered that the spatial planning of towns cannot be completely isolated from the planning of villages and rural allotments. In most parts of Europe, there are clear signs of the nucleation of formerly dispersed agrarian settlement patterns, mainly since the 6th century but foremost between the 10th and 13th centuries. It should be noted that this is largely the same period as the great surge in town creation. It is not clear to what degree this nucleation was deliberately planned, but often it seems at least to have been stimulated by landlords and in many cases traces of planning can be recognised.57 Probably already in the 7th to 9th centuries, villages with regular plans were laid out in northwestern Europe.58 In the parts of Europe roughly north of the Alps, villages that were created as cores of new reclamations often had plans that corresponded to the allotment of the reclaimed fields.59 Reclamations were often undertaken systematically and at a significant scale. The landlords or the people they employed often seem to have organised the works and the spatial layout, to which the settlers had to conform.60 The basis generally was a partition into fields of equal size, for which a specific rent or yield was established. This commonly resulted in fairly regular spatial order. Sometimes this order was radial, but mostly it worked with principally straight and parallel boundaries, often at more or less right angles, leading to orthogonal structures. Particularly in the many cases where reclamations were directly related to water management (drainage, diking or irrigation), central planning was almost inevitable. This generally led to regular spatial order, which often also influenced the structure of the villages.61

10.2.1.1 The planned village

(fig.10.9: Plan of Winchester. The lightly stippled lines indicate the streets of the original plan of the Roman city of Venta Belgarum, and the thick line indicates the circuit of the town wall. This town wall was re-used for the foundation of the fort-settlement or burh of Winchester by King Alfred the Great of Wessex in the 9th century. The streets of this burh were laid out in a more or less orthogonal structure, but followed other courses than those of the Roman plan (continuous lines). Darker stippled lines indicate streets and features of later date. (From: Aston & Bond 1976))

57 Chapelot & Fossier 1985, pp.60, 134-137, 167-168, 327. At large, the creation of villages seems to have been linked to the general establishment of the ‘feudal system’.  
58 Biddle 1976, p.31. In England, regular plans have been found of Anglo-Saxon villages of the 7th and 8th centuries. On the continent, villages with planned regular plans were created in the Frankish period (6th–9th centuries) together with large-scale new clearings. It regards among others the so-called Kurzgrundhufen. (Nitz 1974, p.356; 1991; 1994 (II); Schuyf 1988, p.24)  
60 Schuyf 1988, p.19.  
61 See par. 10.4. See for example, the reclamation of the peatlands in The Netherlands on the regular scheme of the cope: Van der Linden 1956. There are various specific types of villages that are related to the specific sorts of reclamations, varying with the type of soil, altitude, method of reclamation and regional tradition. In Germany, for instance, among others the Waldhofendorf, Angordorf and Rundling are distinguished, largely on the basis of their plan structure. (see Roberts 1987; Roberts 1996; Schuyf 1988; Westermann großer Atlas zur Weltgeschichte 1988, p.76)
It is well possible that the planned and often more or less orthogonal forms of villages and allotments of newly reclaimed or reorganised fields had some influence on the layouts of new towns, particularly smaller ones probably. In this context it should be considered that often there was no clear distinction between larger villages and smaller towns with regard to the spatial structure. Unfortunately, it is not possible to draw hard conclusions as to whether, or in what amount, there was a connection between village planning and town planning, by lack of sources.

10.2.2 Increasing regularity in the plans of new towns

As appeared in the previous chapters, many hundreds of towns have been newly founded in Europe, mainly from the 12th to the 14th century, with a peak in the second half of the 13th century. Looking at the period at large, one can recognise a general development in the town plans towards greater spatial regularity, which tended to work towards true orthogonality. This tendency was especially evident during the 13th century.

Various possible reasons are imaginable for this growing regularity. Increasing experience with the creation of new settlements most probably played a role. Various cases are known in which persons who had experience in creating new towns or other large-scale building operations were employed by a founder. The status of these persons is not always clear, but they could be general organisers (hired or as entrepreneurs), legal experts or sometimes surveyors or engineers. To what degree these people were involved in the spatial planning of the settlement is unclear, but it is most likely that the growing experience of persons and organisations with creating new settlements led to optimisation of the organisation. This probably meant that the creation process took less time and was better directed, regulated and controlled, so that the initial plans were followed more closely and the spatial layout became more regular.

Keith Lilley suggested that the increasing geometric regularity of the town plans must have been fed by a growing theoretical knowledge of geometry, especially through knowledge of antique sources. In his opinion the grid plan in the postclassical period was not necessarily inspired by antique models, but the geometrically regular plans, which according to Lilley started to appear in the second half of the 12th century, would have been made possible only by the antique knowledge of theoretical geometry, as provided by Euclid’s...
classical treatise the Elements. This work was translated from Greek into Latin around 1140, by Adelard of Bath. The importance of Euclid’s Elements and Adelard’s translation for the knowledge of theoretical geometry in Europe from the 12th century could hardly be underestimated, but it must be doubted whether it would be necessary to know the contents of the Elements in order to be able to set out a regular grid plan. Euclidean geometry is something quite different from the simple ‘practical geometry’ needed for laying out a grid plan, no matter how regular it is. The knowledge for setting out straight and parallel lines at right angles had been present for a long time already, most probably ever since the Roman period, at least among schooled men.

The crucial factor, however, is accuracy. And the amount of accuracy depends on the tools that were used, the experience the surveyor had, and most of all, the importance attached to geometric accuracy (by the commissioner, the planner, and the surveyor). As Slater points out, it seems likely that many of the ‘quasirectilinear’ plans, as Lilley calls the less regular plans, were in fact laid out with an ideal of a regular orthogonal plan in mind, but since practical considerations relating to the existing natural and cultural features of the site were taken into account, the ‘ideal’ would be adapted considerably. Apparently, this pragmatic attitude in laying out new settlements changed in the course of the 12th to 14th centuries. In my opinion this is not difficult to imagine. In a landscape where land became ever more scarce as the population grew, and in a society in which the process of quantification developed rapidly, changing the perception of time, space, movement and matter, this must have resulted in the ‘pecuniarisation’ of the land, which in its turn must have stimulated the accurate quantification of it and thereby the regularity of its spatial partition. But it was not only a question of economics, symbolic values also played a role: the striving for cosmological order was a factor behind the process of quantification of which the importance may not be underestimated, and the regular order of inhabited space was also seen as a mirror image of societal order.

Another factor that must have played a role in the higher level of regularity, at least in the structures of the towns as we presently know them, is the increasing number of ordinances with regard to urban form. These ordinances regarded new towns as well as existing ones. Particularly since the 13th century, the number of regulations that saw to hygiene, security (especially from fires) and a beautiful and regular appearance of public space in towns and cities increased considerably.

---

70 Lilley 1997, pp.200-201; 1998, pp.82-88. See also the discussion that Lilley’s article provoked in Urban Morphology vol.3 (1999), 2 (Slater 1999; Lilley 1999 (2); Scrase 1999) and vol.4 (2000), 1 (Boerefijn 2000 (2), pp.25-36); furthermore Slater 2004, pp.50-56.

71 On the contemporary knowledge of geometry: see Shelby 1983; Lexikon des Mittelalters VI, 1993, lemma Mathematik. On the method of laying out a grid plan, see par.9.6.1. See also par.6.5 and Boerefijn 2000 (1), pp.25-26.


73 See Guidoni 1976, ch.5 and 6, in which this development is described, be it rather vaguely.

Many scholars believe that true planned regularity was only achieved with the ‘renaissance’ of the 15th century, but this is clearly wrong. See chapter 11.

74 See Dijksterhuis 1977, pp.136-244; Crosby 1997.

75 See par.8.6.

76 See pars.8.6.1-8.6.3.
10.3 New towns with regular plans after the high-period of town foundation

Since the 15th century, much more is recorded of urban design and the people who were involved. In this period, theoretical treatises on architecture and urban planning start to appear in which theoretical questions are addressed and designs of towns and cities are described and depicted.\textsuperscript{77} The appearance of these treatises was mainly based on a strongly increased interest in, and imitation of, the antique Roman architectural treatise of Vitruvius, \textit{De Architectura libri X}, of circa 30 B.C.\textsuperscript{78} The subject of town building is treated in chapters IV to VII of book I of this treatise. In these chapters, directions are provided for the creation of the various physical elements of the city.

Up to some decades ago it was almost commonly thought that Vitruvius’ treatise had been lost until it was rediscovered in the 15th century.\textsuperscript{79} This is not true though. Vitruvius manuscripts were always held in high esteem in the previous centuries, and were often copied in monasteries.\textsuperscript{80} It is, however, only in written sources of the late 14\textsuperscript{th} century that a renewed interest in town building theory can be noticed. The particular case in point is the entry ‘Which form should the beautiful and well-built city have’, in the encyclopaedic work \textit{El Crestià}, written by Francesc Eiximenis between 1381 and 1386.\textsuperscript{81} In the 15th century, quite many theoretical works were written on architecture and town building, largely influenced by Vitruvius. The first treatise that was written after his example is Alberti’s \textit{De Re Aedificatoria}, which was completed in 1452. After that, various other treatises followed in which town building theory was described, whether or not as an element of the wider discipline of architecture in general. Dozens of designs were published of towns that, under the influence of a misunderstanding of Vitruvius and the contemporary method of fortification, had perfectly regular

\textsuperscript{77} The designs have often wrongly been called ‘ideal cities’; see par.8.4.
\textsuperscript{78} Vitruvius ed.1962, editor’s introduction, p.XIV.
\textsuperscript{79} Krinsky 1967, p.36. See also ch.11, n.69.
\textsuperscript{80} Krinsky 1965.
\textsuperscript{81} See par.8.2.1.
polygonal outlines and often radial street plans.\textsuperscript{82} Very few of these designs were ever actually real-
ised, but in smaller projects, such as the (re-)planning of squares, streets, extensions and fortifications, the
theoretical writings certainly influenced urban creation.

In the study of town building history of the 15th century and beyond, the theoretical literature has
commonly received much more attention from scholars than did the practice of urban creation. Hence, the
designs of the treatises of the 15th to about the 18th century have become more well-known than most of
the works that were actually realised, and the general image of the practice of the period is often too much
coloured by what is known of contemporary theory. In fact, the actually realised towns that have received
most attention, such as Pienza (from 1459) and Palmanova (from 1593, fig.10.12) in Italy, Versailles (c.1670)
in France and Karlsruhe (c.1720) in Germany, can be regarded as proto-typical exceptions that are strongly
influenced by the designs from the theoretical literature.\textsuperscript{83}

Hence, there is a strong contrast between the high-period of town foundation and the period of roughly
the 15th to 18th centuries. In the first period many new towns were built in Europe, but the designs behind
them are hardly ever known. The many designs that are known from the theoretical literature of the late 14th
to 18th centuries, on the other hand, were relatively rarely actually realised in practice. So, from the period
between antiquity and the late 14th century, we only know practice, and it may be assumed that there was little
theorisation, while from the 15th to 18th centuries we know the theory well, and there is relatively little atten-
tion for what was actually built. In fact, relatively few new towns were created in Europe in comparison to the
period of the 12th to 14th centuries.\textsuperscript{84} In chapter 11 this discrepancy will be considered in more detail.

\subsection*{10.3.1 Colonial towns and cities}

In paragraph 10.1 it is described that the newly created towns and cities of the ancient Greeks and Romans,
often having orthogonal layouts, were mostly created in a context of colonisation. For the period of reviving
urban culture in Europe, roughly the 10th to 14th centuries, it generally was not much different. It has already
been described in detail that the new towns in Wales and southwestern France were mainly created as elements
in colonisation processes. In the first case it regarded external and in the second case internal colonisation.\textsuperscript{85}
In England, Ireland, along the coasts of Scandinavia and the Baltic new towns were founded in processes of
external colonisation as well. In the parts of central and eastern Europe roughly east of the river Elbe external
and internal colonisation combined, although the general phenomenon of town foundation and concentration
of settlement in villages broadly moved from west to east.\textsuperscript{86} On the Iberian Peninsula new towns were founded in the context of the external colonisation that followed the \textit{reconquista} on the Muslims from the north.\textsuperscript{87} Apart
from the colonisation in these specific areas, there also was an ongoing internal colonisation in many regions
of western and central \textit{Europa} in which new land were reclaimed and new settlements created.

The new towns in northern and central Italy were mostly built in areas that had already been cultivated
since a long time, and that also happened elsewhere, as for instance in the Rhineland. In these cases, too, the
principal goal generally was to gain control over a specific area in political, economic and military sense, and
therefore the goal can also be regarded as colonial in a certain sense. Particularly the towns that were founded
by the city-states in Italy are colonial, in the sense that they were satellites of the mother cities.\textsuperscript{88}

At the end of the 15th century, the transatlantic colonisation started. The first colonial town in America, Santa
Domingo (Hispaniola), was founded in 1496 in the present Dominican Republic. Its original form is not known,
but in 1502 it was rebuilt on an orthogonal grid plan.\textsuperscript{89} Most other new colonial towns were also laid out on
orthogonal plans. Many scholars have regarded this a feature that was ‘typical of the Renaissance’: the orthogonal

\textsuperscript{82} This radial street structure was based on a misinterpretation of Vitruvius. From the 15th to the 20th century it has almost generally been accepted that Vitruvius meant that
the urban plan ideally had a regular polygonal outline and streets that radiate from the centre. (Hesper 1989, p.135; Germann 1976, p.17) But actually he only wrote that
the outline should not have sharp or right angles; instead it should have a convex curve with protruding towers. With regard to the streets he just wrote that they should not
be oriented towards the eight winds (the four main winds from the cardinal points, and the four half winds). (Vitruvius ed.1962, book I, ch.5, 2; ch.6, 4-8)

\textsuperscript{83} Morris 1972, pp.118-212; Benevolo 1980, ch.9. See also pars.11.2, 11.3.

\textsuperscript{84} See pars.1.1, 1.3, 1.2.5 and figs.1.1, 1.2. In The Netherlands, for instance, over 140 towns (103 of which were walled by 1550) were founded or promoted between the
late 12th century and 1550, more than half of which was probably largely newly planned. After 1550, however, only around 20 towns were added until the middle of the 20th
century, of which about half was largely newly planned. (Fockema Andreae 1948, p.124)

\textsuperscript{85} See pars.1.1, 1.4, 1.2.5 and 2.3-2.5.

\textsuperscript{86} Zernack 1994. See also par.0.1.3.

\textsuperscript{87} Gautier Dalché 1979; Bartlett 1993; Lilley 1997.


\textsuperscript{89} Reps 1965, pp.27-28, fig.14; Guarda 1965, p.211; Nitz 1972, p.389.
town plans of colonial cities of the antique period were imitated in the new colonial towns, which would have been possible particularly due to the rediscovery of the classical treatises on architecture (Vitruvius) and layout of military camps (Vegetius, Polybius, Hyginus). This image is, however, based on an oversimplified view of history: on the basis of the material of towns that were actually built, one can recognise an ongoing development through the centuries rather than a sudden rebirth. This development started in Europe around five centuries before, and now it was suddenly ‘exported’ to America. Later on, it was also to move to other continents.

Particularly in Spain one can clearly recognise continuity in urban creation, because the reconquista continued from the 8th century to the end of the 15th century. A process of colonisation, involving among others political, administrative, social and economic integration, was connected to the re-conquest. This meant among others that new settlers were lured to the newly conquered parts and accommodated in new towns or new additions to existing towns. A good example is the town of Santa Fé (fig. 10.13), which was founded by King Ferdinand and Queen Isabella of Castile as a military fort during the siege of Granada in 1491. Although its initial purpose was different from that of most other newly founded towns in Europe, it is clear that in its form it basically follows the same principles as many of the new towns of the previous centuries. In fact, the creation of the town formed part of a tradition that was centuries old. Subsequently this tradition was to be continued in the Indies and elsewhere.

---

90 See pars. 10.2.1, 10.3.
91 It should be noted, however, that in Asia there was also an old and ongoing indigenous tradition of settlement planning on strictly orthogonal basis. (see Marco Polo’s description of Dadu (Beijing) in par. 8.6.4, and the subsection following it) In America, older indigenous settlements had also been built with orthogonal layouts, but this does not seem to have been an ongoing tradition. (Egli 1962, pp.400-437)
93 Reps 1965, pp.2, 12-15, 31, 73; Guarda 1965, pp.18-24, p.46, n.72; Nitz 1972, esp. pp.389-391; Kostof 1991, pp.113-124. On the margins of Europe, however, the tradition also went on with further colonisation in northern Ireland, Scandinavia (see Ahlberg 2005) and eastern Europe. In Ulster, for instance, Londonderry was newly founded in 1611 by a London-based development company. Its plan bears reminiscence to the structure of the terracinae fortis. (see: Reps 1965, p.15; Beresford 1967, p.312; Morris 1972, pp.94, 282, 290)
In 1573, King Philip II of Spain ordained that the towns that were founded in the transatlantic Spanish colonies, had to be built and organised according to the Leyes de Indias (‘Laws of the Indies’). Among others it was ordained that the towns and cities were to be laid out by use of chord and rod and that the public places were to be rectangular, with galleries going around and four streets giving access. Nothing is explicitly mentioned about orthogonality, but the rules as well as the built results clearly indicate that orthogonal order was essential.94 Many authors have represented these Leyes de Indias as ‘a genuine product of Renaissance thought’, because they believed that many of the rules for new town planning were directly copied from Vitruvius’ De architectura libri X.95 This idea is, however, largely wrong. It seems to stem from an inherent urge to link historical events to what have generally come to be regarded as typical ideas of the period, in this case ‘the Renaissance’. In fact, a number of the rules in the Leyes seem to have been based directly on Vitruvius’ treatise, but most of them rather stem from the long tradition of new town planning in Europe.96

Eventually, not only the colonial towns of the Spanish were laid out on orthogonal plans: those of other colonial powers, in America as well as on other continents, were commonly built on orthogonal grids from the 16th to 20th centuries. Moreover, non-colonial administrations also chose for the orthogonal grid as most suitable spatial structure. One of the most rigorous applications of it was the Land Ordinance, which was instituted in the United States in 1785. This ordinance did not only regard urban structure, but the whole spatial structure of newly colonised lands, which were divided in pieces of six mile square, the townships, that were subdivided in 36 smaller squares for the module of private property.97

10.4 Some considerations on the historic use of the orthogonal grid in space design

Since many centuries, the grid has been used for ordering urban and rural space in situations of colonising and reclaiming new territories.98 With the grid, the authorities enforced their spatial order on existing cultural and natural structures. In this way, this spatial order could work as a symbol of dominion, of man over nature or of one authority over society.  

Iso-morph as it is, the orthogonal grid equalises what is unequal; it brings regular structure to unordered space. In this sense, it can be seen as the counterpart of the objectivation of time through a systematic conception, quantified by the use of calendars and clocks.99 The spatial grid is essentially un-natural, or even anti-natural. Natural landscape is always irregularly differentiated. Laying a grid over it, in reality or in the mind, not only ‘equalises’ the land, it also becomes possible to determine specific place, and it makes the land dividable, no matter which form the natural landscape has.

In a sense, man makes the land his own, when he is able to orientate in it. When one knows the landscape from experience, its irregularity serves as reference by the remembrance of specific points. But when one does not know the landscape from experience, abstract systems of spatial order facilitate orientation.100 It is therefore that authorities that strive for control over indigenous nature or man, such as colonial and totalitarian regimes, use regular systems of spatial ordering, particularly the orthogonal grid. By erasing the irregular and differentiated space with which the local people identify, and replacing it by absolute and ‘universal’ order, this space and its inhabitants are incorporated within the larger structure of the state or the empire.100 Orientation thereby becomes equally easy for the newcomers as for the indigenous, for the controlling powers as for the local-born. These principles can be seen at work in, for example, with the re-foundation of the Chinese imperial capital of Chang’an in the 6th century, with the regularisation of the streets of Florence around 1300, and with the restructuring of the street plan of Paris in the 19th century by

95 For instance: Kostof 1991, p.114; Nitz 1972, p.389 (see Guarda 1965, pp.18-19). Likewise, many authors, such as Rahmsdorf (1999, pp.51-52), hold new towns of the 16th and 17th centuries in Europe, such as Sabbioneta (northern Italy, mid-16th century) or Vitry-le-François and Richelieu (France, resp.1545 and 1650) for being typically inspired by the Roman towns and military camps, while in fact, the resemblance is much closer to orthogonal towns with rectangular outlines of the 13th and 14th centuries.
96 Reps 1965, pp.30-31. According to Guarda it was not primarily Vitruvius who was copied, but rather Saint Thomas’ De regimine principum of the late 13th century, as far as the rules for the siting of new towns were considered. With regard to the foundation of Bora (Chili) in 1606, the chronicler Rosales even explicitly refers to this source. (Guarda 1965, pp.33-43; 50) Thomas, in his turn, was inspired by Vitruvius on this point, as well as by Vegetius’ Epitoma rei militaris. (Thomas van Aquino ed.1997, pp.39-49)
97 However, the rules on the siting of new towns of Vitruvius, Saint Thomas and the Leyes de Indias remain very much of a theoretical, or even topical nature, because in actual practice they mostly not appear to have been followed closely. (Guarda 1965, p.34; n.40)
98 See also Nitz 1972; Kostof 1991.
99 See also Nitz 1972; Kostof 1991.
100 Lynch 1960, pp.123-139.
Haussmann. Most probably it also played a role in the forced re-settlement of rural dwellers in new towns in the high-period of town foundation, and certainly in other projects of forced resettlement in more recent times. Spatial order has always been an important instrument in forcing culture and control upon ‘wild’ nature and otherwise hostile territory, thus facilitating control by the authorities and strengthening societal and cosmological order.

The orthogonal grid as a system of spatial organisation has been used by oppressive governments, removing elements of personal or local identification, and thereby equalising the landscape and its inhabitants. But, ambiguously as it may be, since the regular grid essentially divides into equal parts, it can also be seen as reflecting equality among the people living in it, and therefore as a symbol of democracy. In paragraph 8.5.1 it has been suggested that it is possible that the regular orthogonal grid had a similar connotation of ‘ideal equality’ in the new towns of the 12th to 14th centuries.

No matter, however, what its meaning or intention was, the regular orthogonal grid plan is always a sign of planning and centralised (political) control, and it clearly demonstrates a desire for the measured apportionment of the land.

Up to this very moment, many new towns are built on orthogonal grid plans. In the 16th century the radial layout became a favoured subject to theorists of urban planning and in the 18th century the picturesque irregularly ordered spatial layout became widely appreciated. Around 1900, the orthogonal urban layout was much detested, and the same holds for the period around the 1970’s. But despite all that, the orthogonal grid remained the basic structure on which many, or probably most, new towns were built.

---

102  Chang’an: Kostof 1991, p.99; Florence: Friedman 1988, pp.211-218 and par.8.6.2; Paris: Benevolo 1993, pp.834-847. The restructuring of the street plan of Paris by Haussmann was an example that was followed in countless other cities over the world.

103  For instance, in the 10th and 11th centuries in the Spanish colonies in the Americas, in the 20th century in Nazi-Germany, the communist DDR, Rumania under Ceaucescu, Guatemala in the 1980’s and, more recently, with the suppression of the Kurds in Iraq under Saddam Hussain. (see AlSayyed 1992; Denecke 1992, pp.319-327)

104  See AlSayyed 1992. Lefebvre considers the colonial town and orthogonal spatial organisation mainly as instruments of production. (Lefebvre 1991, pp.151-152)

105  The grid has, for instance, been taken as a symbol for democracy with regard to the Greek colonies, which were in fact much less democratic or egalitarian than has often been thought. (see Kostof 1991, p.99)

106  Later politicians and designers, such as Thomas Jefferson and Idefonso Cerellà (architect of Barcelona’s famous grid plan in the 19th century) also considered the undifferentiated structure of the orthogonal grid to reflect social egalitarianism. (Hayden 1979, p.20; Kostof 1991, p.100; Miller 1977, p.12.)

107  Stanislawski 1946, p.108; Carter 1975, p.154. Planning and centralised control can also be read, of course, from other geometrical regular spatial structures, such as the radio-concentric plan.

108  For the radio-concentric structure, see par.8.4, 10.3. and for the picturesque, see par.11.1.