About this Translation

Joseph Stübben initially published City Building (Der Städtebau) in German in 1890 as part of a handbook on architecture (Handbuch der Architektur). This Handbook was published in Germany by Durm et al. (1890) between 1883-1933. Stübben subsequently published completely revised versions of Der Städtebau in the 1907 and 1924 editions of the handbook. The 1890 edition is still published in Germany as a reprint.

In 1911 Adalbert Albrecht translated the 1907 edition of Der Städtebau into English. This translation is available in the MIT rare books collection, and as a typescript at the Frances Loeb Library at Harvard University. It contains all chapters except for Part V. However, a translation of a summary of this part exists elsewhere.

It should be noted that this translation is not exact (e.g. some sentences are not translated literally but rather in terms of their general meaning). Further, the translator was not a native English speaker and the original as well as translated texts are over a hundred years old. For these reasons, the text is written in old-fashioned “German English” and thus often not easy to read. In this book we publish Albrecht’s translation basically unrevised, as a historical document, with all of its flaws.

The typescript did not contain any figures. Since the value of the book depends heavily on the large number of figures referenced in the text, we added these to the translation (except for the majority of fold-outs). The German reference edition for both text and figures is available as a free e-book. This edition can also be used to access the missing content in Albrecht’s translation, such as the fold-outs and bibliography.

6 Available at https://archive.org/details/dersttedtebau00stgoog.
Acknowledgments

This translation of the typescript (497 pages) was published courtesy of the Rotch Library at MIT. We thank the MIT library staff, in particular Jennifer Friedman and Jenn Morris, for their assistance. MIT Libraries Document Service was helpful in making the translated copy available to us in image form in 2008. A group of staff and students at Arizona State University then helped transcribe the 497 pages of image files into text format since OCR techniques could not be used. We are especially grateful to Sue Mahalov in this context and also appreciate the contributions of Tyler Eltringham, Geoff Prall, and Tracy Geiger. Amanda Bosse and Dan Bartman were instrumental in formatting the text in InDesign. Thanks also to Aaron Kimberlin for technical support. We thank Peter Swift for his initial encouragement and advice on the historical importance of Stübben’s work. Finally, librarians at the Ludwig Maximilian University in Munich, and Dr.-Ing. Renate Fritz-Haendeler helped with reference searches and the libraries made the original hardcopy versions of the books available. Thank you to all!
Foreword

Josef Stübben (1845-1936) was one of the most important and widely known city planners of the late 19th and early 20th centuries. Although he was a prolific writer, and he wrote some articles in English, his major work, “Der Städtebau” (“Town building”), an encyclopedic text on the principles and practice of city planning, was never translated into English. The unfortunate consequence is that this highly significant planning textbook has never been made widely available to an English speaking audience. Now, as the lost art of city building is experiencing a rebirth in the U.S., Stübben’s great work is regaining attention.

The first edition of this book was published in 1890. It was the equivalent of an encyclopedia of city planning, Reinhard Baumeister has published in 1876 the first book on City Building. In 1890 Hermann Josef Stuebben published his part of the Handbook on Town Building in a very detailed way. The second edition followed in 1907 and the third in 1924. The 1890 edition was reprinted in Germany, in 1980 and is still considered to be a useful text on city planning, not just a historical document. The final edition of “Der Städtebau” included 900 illustrations, presented in thirty chapters and twenty-three appendices.

Stübben was a Berlin-trained architect who also had a doctorate in civil engineering. He was appointed head of the office of city planning, first in Aachen from 1876 to 1881 and then at Cologne, Posen and Berlin where he worked as Geheimer Baurat (architect to the political institutions and Beigeordneter (member of the community Council). During his career he was involved in city planning studies of more than thirty cities in Germany and abroad. The book “Der Städtebau” uses materials and draws from the experiences of his long career as a city planner.

Stübben was one of Europe’s best known planners, ranking alongside Camillo Sitte and Raymond Unwin as the leading European planning practitioners with direct influence on the development of American city planning. The major works of Sitte and Unwin are in English and are still being published. Unwin’s 1909 Town Planning in Practice was recently reissued by Princeton Architectural Press. Camillo Sitte’s major work, The Art of Building Cities (1889), was translated into English in 1945 and is now widely known to American planners and architects. The lack of an English translation of Stübben’s major city planning text from the same period is an obvious, missing link.

Stübben had a high profile and presented papers at numerous city planning conferences. One of the most important was his address at the 1910 conference on city planning sponsored by the Royal Institute of British Architects in which Daniel Burnham, Ebenezer Howard, Patrick Geddes and Raymond Unwin were
also featured. Also in that year, the U.S. Senate published an official document on the new American profession of city planning that contained examples of German planning legislation under the direct influence of Stübben.

Most historians agree that the basis of American city planning, which was professionalized in 1909, is largely drawn from two sources: England and Germany. Historian Brian Ladd, in his 1990 book Urban Planning and Civic Order in Germany, 1860–1914, wrote: “The academic discipline and administrative practice of city planning as we know it today, however, was born in Germany during the decades before World War I” (p. 1). It is also recognized that the roots of German planning have not been as widely studied as the English roots. That Stübben was never translated is probably due to the fact that the U.S. fought two major wars with Germany during the 20th century. One scholar noted that the volume of German material being cited and translated in architectural journals went from “a generous proportion in 1900 to a mere trickle in 1911”.

Yet before World War I, German city planning was much admired in America, during the time when American city planning was in its formative years. Many American planners, among them Daniel Burnham, Frederick Law Olmsted, Jr., and John Nolen made regular trips to Germany during this time to study how the Germans, generally regarded as exemplary city planners, were addressing their planning problems. Daniel Burnham took a grand tour of Germany in 1901 and wrote that he believed the Germans were far ahead of the Americans in their planning expertise. The German approach was heralded because, the American planners believed, the Germans were able to achieve the fundamental goal of planning at the time: the merger of the goals of beauty and efficiency (what was practical was beautiful and vice versa).

**Current Relevance of Stübben**

The translation of Stübben's book is relevant on two fronts: as an important historical document and as a still-relevant manual of town planning practice. As a historical work, the book will provide important insights into early city planning practice in the U.S., because of Stübben’s influence here. But perhaps more importantly, “Der Städtebau” is still useful and relevant today, as planners seek to revive the lost traditions of town planning that were at the forefront of planning in the early 20th century.

Stübben's work will be of particular relevance to the many people involved in what is known as New Urbanism, an urban planning and design movement with about 2,000 paying members working to reform the way cities are built in the U.S. This movement extends beyond the New Urbanist organization itself and is now
embedded in much of the current thinking about city planning practice.

The basic agenda is to reform all aspects of real estate development, including new development, urban retrofits, and suburban infill. In all cases, New Urbanist neighborhoods are designed to be pedestrian oriented and contain a diverse range of housing types and land uses. There is support for regional planning for open space, appropriate architecture, a more prominent and well-designed public realm, historic restoration, safe streets and green building, among other principles.

Importantly, the New Urbanists have worked to revive the art of city building by looking to past practitioners. Planners working in the first decades of the 20th century are particularly relevant precisely because of the specificity of their planning proposals. They were deeply involved in formulating the design of urban places, from streets to plazas and squares, to complete neighborhoods, parks, and all other fundamentals about how cities can be beautifully designed. To the New Urbanists and many others working to revive these lost traditions, this was city and town planning at its finest.

Obviously, the principles of city planning that Stübben detailed in his encyclopedic work will not be directly transferable in all cases. But they are a critical resource for understanding the logic of planning cities in a way that merges practical, technical and artistic notions of human settlement. How these elements of the urban environment are put together is something city planners, and especially the New Urbanists, are dedicated to understanding, reviving and implementing.

Stübben’s “Der Städtebau” will be a much needed addition to the lexicon of the art of city building.

Emily Talen
Julia Koschinsky
PART II

COMPONENT PARTS OF THE CITY BUILDING PLAN
PART II

CHAPTER 1: Building Blocks

The areas in the city building-plan surrounded by streets and building lines and intended to be built on are called “building blocks” or simply “blocks.” They are formed when the areas lying between the principal traffic streets are further divided by side and cross streets until they are reduced to a practical size for building purposes. This division is frequently not undertaken at the time the street-plan is designed and carried out, but is put off till later, sometimes until construction has actually been begun on the areas in question. This practice has both disadvantages and advantages. The former consists principally in making it uncertain at what points on the main streets, where building is constantly going on, the side streets will cut in. Consequently new buildings are often erected on sites which are later found necessary to use for the cross streets, or houses intended for corner structures find themselves in the middle of a block while buildings with bare, unsightly sides disfigure the corners of the new streets. Such examples are unfortunately not rare in the modern parts of our cities. The later division of the blocks has however the great advantage that one can be more sure of meeting and satisfying the most important requirements in the laying out of the cross streets and in determining the measurements of the blocks. It requires much care and foresight to accomplish this and at the same time to avoid the evils mentioned above if the cross streets are laid out in the beginning. It is best of all to design the whole building-plan with all its details but to carry it out only step by step, with the necessary alterations, as the growth of the city demands it.

The requirements that are to be made of blocks and sites, which were discussed in a general way in part I, chapter 1, are very various. Factories require extensive, undivided areas; for workmen’s houses on the contrary narrow blocks are desirable. Business districts need large street frontages and direct, also diagonal, traffic lines; corner lots with acute angles are favorable for business purposes under certain conditions. Blocks for private houses require suitable spaces for gardens, whether the houses be built in closed rows or detached; a corner site, particularly an acute-angled lot, is little suited to a private house that is built in a row. Blocks that are rectangular or approximately so are especially desirable for such houses. With flat-houses the gardens are as a rule a negligible quantity but airy courtyards should be provided for; blocks of little depth prevent the building of rear houses being carried to extremes which lead to improper housing conditions. Corners are desirable for flat-houses.
Suitable measurements for building blocks are as follows:

For manufacturing plants.  
100 m (328') deep, 200 (656') m long  
and more

For single houses  
80 m deep, 160 m long

For detached houses  
up to 100 x 200 m

For flat- and business houses.  
60 m deep, 120 m long.

For workingmen's dwellings.  
From 35 to 50 m deep,  
from 100 to 150 m long.

In these block measurements the relation of the depth (breadth) to the length is usually 1:2, for workingmen's dwellings 1:3. These proportions and measurements are however only the approximate average which can have but a relatively small influence compared to the demands of traffic and the local manner of building. The latter, as well as existing ways and property boundaries, must always be taken into consideration as far as possible. Figs. 1, 6, 13 to 18, 19 & 20 show blocks in Dresden, Stuttgart, Berlin, Magdeburg, Cologne, Trieste, Rotterdam, and Vienna in which wide variations appear. Even in the same city the blocks should not be made of uniform size as the requirements of depth and space differ greatly.

With the exception of those designed for public buildings and workingmen's dwellings, blocks of from 120 x 300 m to 50 x 100 m are desirable. Smaller building blocks than those containing 5000 sqm are indeed undesirable but often cannot be avoided at the intersection of important streets. In the suburbs of Cologne the largest block (which may yet perhaps be divided\(^1\)) contains 65,000 sqm, the smallest 2,200 sqm, the average size being 13,000 sqm. If necessary even very small blocks can be used for building; in the old city in Cologne, for instance, there are some of only 130 sqm. Too small blocks have the disadvantage of too limited court and garden areas. Too large blocks are just as undesirable because the single building lots are too expensive and this delays their purchase and use, and in addition, they invite the erection of rear buildings. Though the inside of a block may be open when it is first built one cannot be sure that it will permanently remain so. When the property increases in value the space is frequently used for rear buildings of all kinds, even for workshops, places of amusement etc. that do not require street frontage, thus bringing about a condition that is more unpleasant for the dwellings than the limited space of a small block. As a rule, therefore, blocks of medium size are the most desirable but due consideration must of course be paid to conditions prevailing in that part of the city and to the purpose for which the block is designed.

\(^1\) Has since been divided.
Blocks or parts of blocks for public buildings require an attractive situation and should be suitably regular in form; the size of course varies greatly. Churches, for example, require as a rule from 30 x 50 m to 40 x 70 m, market-halls about 3000 sqm, high schools about 5000 sqm.

A popular arrangement of blocks for workingmen's dwellings is shown in the Stahlhausen colony near Bochum (fig. 65). The detached houses, each of which is divided on the ground-plan into four dwellings, occupy building lots of 4 x 170 sqm. It may be said in passing that these houses are by no means to be recommended as the most desirable workingmen's dwellings. The plan of the streets might be less uniform. If the houses are to have cattle stables the latter should be made accessible by group-building(fig.57) or by providing roads in the inside of the blocks.

Oblong blocks are the easiest to build on and generally the most advantageous. Consequently the endeavor to make as many rectangular or nearly rectangular blocks as possible in the city plan has always predominated. From the standpoint of traffic and beauty however it is a wrong-headed method to make the formation of rectangular blocks a chief, or worse, the sole aim, particularly if it results in that monotonous checkerboard pattern that we find, for instance, in Mannheim and in many American cities where the streets and blocks are numbered and lettered and actually can scarcely be distinguished from one another except by their numbers. This does not meet the real demands of our life and still less does it suit the conditions that now exist in old cities and well-planned suburbs where nearly every street and nearly every block has a pronounced individuality of its own.

The square block is less practical for building purposes than the oblong. As the endeavor to use all the fronts of the block must predominate the building lots in a square block are usually so arranged that it is very difficult to provide suitable yards or gardens (fig. 77). Oblong blocks (figs. 79 & 80), on the contrary, with the exception of the corner lots, provide a large number of practical and pleasant building lots of suitable depth. The figures mentioned show also different arrangements of the property boundaries at the block corners.

If much traffic turns the corner it is sometimes practical to slant it off at an angle of 45 degrees, partly to make it easier for pedestrians to turn, partly so as to be able to round out more decidedly the crossing of the traffic lines (figs. 81 & 82) and partly in order to gain an entrance at the corner, which is particularly desirable for business houses. The width of the beveled corner, measured diagonally, is usually from 2 to 4m. The general use of such an expedient is not however to be recommended as it weakens the effect of the buildings. The cutting off of obtuse corners especially almost always produces an unsightly result; acute-angled corners, on the other hand, require beveling not only to improve the outward effect but also for the sake of convenience within the building. The beveling of acute angles should be greater than that of rectangular corners. In the
former case the bevelled surface usually measures from 5 to 15 m. Frequently corners cut off to this extent may be made the basis of bay or bow windows. In many cases, particularly if there is a front garden the corner may be rounded off instead of bevelled\(^2\) (fig. 83, 84, 90). It would of course be going too far to prescribe that the corner of any building, standing within a front garden, should be cut off. Figs. 83 & 84 show practical arrangements of bevelled, rounded off and full corners. A charming effect is sometimes produced by cutting off the corner of only the lowest story on account of the traffic and building the corners of the upper stories out as usual. In order to increase the width of the roadway where the traffic is great and to facilitate the change of direction “notched”

---

\(^2\) See also: Welche Masse signen sich am besten für die in den Fluchtlinienplänen größerer Städte notwendigen Abschrägungen oder Abrundungen der Strassenecken? Wochenblatt für Baukennenäler 1887, S. 29.
corners may also be recommended(fig.85, 120).

A third block form is the triangle. It is true that it is even more difficult to divide triangular than square blocks into convenient building lots; but this difficulty is offset by the advantage, not only to the city building-plan but also to the lots, of diagonal streets, which are responsible for the formation of triangular blocks. The corners A and B in fig. 78 with extensive street frontages on the main traffic lines, are favorite and good business locations. Unskilful architects or builders have sometimes, it must be admitted, failed to use such corner sites to advantage, often, for instance, placing the building with its back to one of the streets in an unsightly manner, as shown in fig.86. But figures 87 & 88 give an idea of how satisfactorily all the sides of such buildings, with open or closed yards, may be treated. Buildings adjoining the corner houses are also frequently built with their back on the other street, making unlovely spots in the street view. With some skill also this arrangement can easily be avoided. Other block forms are of course to be preferred to the triangular wherever they are possible; but difficulties connected with the arrangement of the houses on the latter should not hinder their being laid out wherever the traffic really requires it, whether it be on a plain or on the side of a hill.
In French plans for city expansion triangular blocks are so frequent that sometimes whole districts are made up of them. Whereas in Germany a large area lying between ring and radial streets is usually divided into four rectangular blocks, the French divide a similar area into four triangles by two diagonal streets that cross each other. They put up with the building difficulties that are thus produced and sacrifice somewhat more land to the streets but gain an advantage in that the diagonal streets attract traffic and that property on them therefore increases in value. When detached houses are erected the difficulties of building on triangular, in fact on any kind of acute-angled blocks, are not so pronounced as it is unnecessary to place the buildings that are set back from the line of the street parallel to the latter; it is customary and pleasing in effect to round off the corners of the front gardens.

Perfect regularity of form in the blocks of a city building-plan is neither attainable nor desirable. Trapeziform and irregular blocks, such as are shown in figs. 90 to 93, are therefore frequent. The illustrations also show how rectangular building lots may be obtained by slanting off acute-angled corners in other ways than by cutting them off diagonally.
The arrangement of the building lots in figs. 89 to 92 is such that the lots on the more important streets, the frontage on which increases the value of the property, are deeper than those on the other streets. Figs. 94 & 95 show the extremely small lots used in Belgian cities. Fig. 90 illustrates how the inside of a block that is too deep for ordinary building lots, is combined with a lot which serves as an entrance and is used for a purpose that requires no street frontage. The inside of a block may be similarly used for a public garden, a school building, etc. Fig. 89 represents a block in Budapest, divided into large building lots (for flat-houses); unfortunately it is very densely covered with houses (compare also figs. 13 to 18).

Merely because of their oddity it should be mentioned that there are said to be city districts in America laid out according to a hexagonal pattern (fig. 80). Apart from other considerations the fact that no through traffic streets are possible in such a plan would stamp it as absurd.

Unless existing property boundaries make it impossible the building lots should be divided at right angles to the flush lines if the houses are to be built in closed rows. With detached houses this is not so necessary as oblique boundary lines between the gardens are not objectionable.
Fig. 90
Division of a trapeze block in Ostende

Fig. 91
Block with 4 corners, irregular shape

Fig. 92
Unregular trapezoid block

Fig. 93
Unregular triangle block
Fig. 94
Division of a rectangular block in Ostende

Fig. 95
Division of construction site Blankenberg

Fig. 96
American hexagonal block

Fig. 97
Sidewalk to cross a long block with detached constructions
PART II

CHAPTER 2:
Different Kinds of Streets,
their Widths and Lengths

a) Kinds of Streets

The streets that are placed in the city plan according to the demands of traffic, construction, health and beauty, as well as streets that have become historical, are outwardly distinguished by their names, in which something of their character is expressed. Among street names we find such designations as: lane, steps, court, cloister, cité, passage, gallery, row, terrace, black-road, way, dam, garden, embankment (quay, pier, slip, canal, dike, wharf,), alley, walk, ditch, rampart, street, allee, promenade, circle (bastion, boulevard), avenue corso (cours).

These designations might be called the surnames, the different members of the same family being distinguished by first names (Elster Lane, Gereons Court, Broadway, Louisa Terrace, etc). In a few exceptional cases the first and surnames have become one, as, for instance, the “Graben” in Vienna and Prague, the “Linden” in Berlin, the “Kuckelke” in Dortmund, “Unter Fettenhennen,” “Im Laach” in Cologne, the “Büchel” in Aachen, the “Zeil” in Frankfurt, the “Treille” in Geneva, the “Canebière” in Marseilles, the “Corso” in Rome.

The surname “Gasse” which was formerly so much respected in all German towns and still is in Southern Germany and Austria is no longer popular in Northern Germany because to people there it erroneously suggests the idea of narrowness and dirt. Yet also in modern plans lanes are sometimes practical and necessary to divide very long blocks. They are particularly to be recommended where the houses are built detached, and on hillsides where they are generally
combined with steps (fig. 97, 98).

While blind alleys, that is, alleys with only one entrance, as well as the numerous uninhabited narrow lanes in old cities, are very properly gradually disappearing (the latter by being closed, sold to the abutters and so on), the courts are still holding their own.

These were formerly for the most part private streets or pieces of property that gradually, in the course of pulling down and rebuilding the houses about them, became extensive common courts with two subordinate entrances or only one entrance. The majority of these courts will eventually be sacrificed to improved traffic conditions, or at least be turned into cross streets, as has already been done with the Sparwaldshof in Berlin and the Gereonshof in Cologne.

The cloisters which are still found in considerable numbers in mediaeval cities are related to the courts. Like the latter they originated in the altered courts
Fig. 103
*Kaiser Galerie* in Berlin

Fig. 104
Pedestrian passageway in Rotterdam

Fig. 105
*Galerie Mazzini* in Genoa
of old cloisters or diection in the cloisters and the cloister-gardens themselves, that have since taken on the character of public streets or squares. They are often very picturesque.

Not so much in German as in French and English cities does it happen that such blind alleys, “courts” and “cloisters” are laid out anew by private individuals or companies. Especially in Paris there are numerous so-called cités, in London innumerable courts, places, buildings and such like, that cut into the building blocks as blind alleys, hook-shaped passages or in some similar form. They are open to the public in the day-time but are generally closed by gates at night. Figs 99 - 102 give as examples the Cités Beaujon, Bergère, and Trévise in Paris and Featherstone Buildings in London. The purpose of such courts and places is to gain more complete use of large properties, which have not sufficient street frontage, for construction. In Paris it is generally the extremely large building blocks that are the cause of the cités. It is important in planning them to provide opportunities for vehicles to turn. The entrances to the French cités and the English courts are frequently built over, with charming architectural effect but sometimes not without detriment to the ventilation. The places shaped like an elbow that are often found on private property are not usually considered permissible for public streets though they do occur occasionally (Nowack-Anlage in Karlsruhe, Quirin-Strasse in Cologne).

A modification of the cités are the passages or galleries of which there are many in German cities. They are generally intended only for foot passengers, are built over above the entrances, are provided with glass roofs and lined on both sides with shops, cafes, and such like. Among the most important passages are: the Kaiserpassage in Berlin, elbow-like in shape with a width of 7.85m
Fig. 107
Victor Emanuel and domed plaza in Milano
length of 125 m (fig. 103); the Passage of Rotterdam, 8.10m and 5.70m wide and 95 m long (fig. 104); the Galleria Mazzini in Genoa, 10.50m wide and 190 m long (fig. 105); and the Galleria Vittorio Emanuele in Milan (fig. 107), 14.50m wide, in the form of a cross, the arms of which are respectively 210 m and 105 m long. The passages in Rotterdam and Genoa connect streets that are on very different levels. In Rotterdam steps are used whereas the Galleria Mazzini slopes up its whole length and the side façades are divided into parts the different heights of which are made possible by domes that interrupt the horizontal sections of the glass roof.

Such covered passages in the central districts of large cities containing jewelers’ and photograph shops and such like, are both practical and pleasant and still more so as promenades. From an artistic point of view they are welcome and attractive connecting links between streets and interior architecture and are often finely decorated. Nevertheless as investments they frequently do not fulfill expectations. They should be at least 6 m wide; passages that are narrower than this, like the Galerie du commerce in Amiens (4m wide), the Augusta Halle in Cologne (3.92m wide) and the Passage Lemonnier in Lüttich (3.80m wide), leave much to be desired in the way of ventilation and light in the adjoining localities. The Galerie St. Hubert in Brussels (fig. 106) which is 5.75m wide may be considered the least permissible limit as regards width.

The English lanes are generally single-tracked streets, the “rows” streets with houses on one side only, the “terraces” separate groups of houses (compare fig. 332). Terraces, “places” and English back-roads, which form the rear approaches to properties that front on other streets, are little used on the Continent. The back-roads have the disadvantage of being dangerous at night and requiring increased police supervision. Otherwise they have so many advantages that their use in business and factory districts might well be considered.

The names “way, dam, garden, hill, bridge, island, bank” etc. have their origin directly in local conditions, in so far as ways, dams, gardens are the descendants of former country ways, dikes, rope-walks, etc., while “hill, bridge, island” etc. are directly suggestive of the nature of the locality. Finally the terms “bank, quay, landing, wharf, embankment” etc. are used to designate streets along the banks of rivers and other bodies of water.

The terms “Twiete ” (alleys) and walk are used in Northern Germany, particularly in Hamburg, to designate narrow cross streets and walks, in which two vehicles cannot pass, somewhat similar to English lanes. Walk is employed for narrow, crooked lanes for foot passengers only.

The names ditch and rampart carry us back to former lines of fortification; sometimes they are the most prominent, at others the most insignificant streets in the city. This depends on whether they are laid out anew on the site of old fortifications of whether they are the remnants of old conditions along the fortified line, affording shelter to the poorest of rowdiest class of the population.
In cities the surname “street” is used for all kinds of highways, from the narrowest lane to the most stately and beautiful street. In the naming of streets we do not distinguish clearly between centrally situated, paved streets and outlying, usually macadamized, highways leading out into the country. In France the central streets are “rues,” the outlying ones “routes.” The English similarly distinguish between streets and roads.

The roadway in the middle, the pavements (sidewalks) on the sides; this is the universal division of all these streets as long as rows of trees do not lead to some other arrangement.

In Italy there is a widespread custom of building the sidewalks as covered ways into the lowest stories of the houses or along in front of them. This arrangement is also found in Southern France and, under the name of “Lauben” (covered walks: literally, arbors or bowers) in parts of Switzerland, Germany and Austria (Berne, Strassburg, Münster, Lübeck, Prague, Meran, Bozen etc.).

Broad streets are capable of being very handsomely developed if they are intended principally for pleasure driving, walking and riding and, partly for decoration, partly for the sake of the shade, are planted with trees. Thus are formed those streets that are known under the name of “allees” or “promenades” or if they are situated on former fortified lines, “ramparts, bastions, boulevards” etc. They are also sometimes called “Rings,” girdles, circles, if it is desired to emphasize the fact that they encircle the city. The French name “avenue,” also in use with us, implies rather that the direction of the street is radial or diagonal. It is generally employed for a street planted with trees, loading from a suburb or outlying district into the centre of the city, or for the approach to a city gate, a park, a palace etc.

In New York the streets that run in the long direction are called avenues, the cross streets, streets. In Hungary the radial or peripherical direction of the street is clearly expressed in its name; the radial streets are called Sugárút, for instance, Vásárhelyi Sugárút; the ring streets Körút, for instance, Váci Körút.

The most pretentious street name is corsc or cours; it is not commonly used in Germany. To Italians corso suggests the street in which all the pleasure driving in the city is concentrated (the promenade for foot passengers or the park driveway is called passeggio); the Corso in Rome is only from 12 to 15 m wide. The French however demand of a Cours that it be particularly wide and stately, containing at least one separate roadway for carriages and one for riding. For a street of this character the Italians use the term Largo or Viale. In this case however, as in all, the name only partially expresses the significance of an object. The subject of street names has been treated in detail here only because it offered the opportunity of reviewing the wide differences in city streets. Besides its position in relation to the traffic, the buildings along it, its profile and the way in which it is decorated, the main factors that determine the rank of a street are its width and its length.
b) Widths and Directions of Streets

In respect to traffic, streets are divided according to their width, in the orders of the Prussian Department of Public Works for putting into effect the line of flight act of July 2, 1875 (see appendix), into side streets of from 12 to 20 m width, traffic streets of medium rank, 20 to 30 m wide, and main traffic streets, 30 m wide and wider. For the busy districts of great cities this classification is undoubtedly correct. For medium sized cities with considerable traffic, like Leipzig, Frankfurt, Hannover etc. the measurements are large enough and to spare; for these cities the division into three classes of, respectively, from 10 to 14 m, from 15 to 25 m and from 26 to 30 m width would probably better correspond to the actual conditions. For ordinary traffic conditions smaller measurements are sufficient; but in addition to traffic, health, beauty, decoration and cost are also to be considered in determining the width.

The above measurements apply only to parts of the city that are yet to be laid out for in the old city districts the streets, even the main streets are not so wide and even where new streets are cut through the rules that govern the widths on a free area cannot be applied.

The Hochstrasse in Cologne may be mentioned as one of the narrowest main city streets; in parts it is not wider than 5.50m and only now is gradually being widened to 8.16m by setting all new structures farther back. To the narrowest side streets in existence belong the Vico della pace in Genoa, 1.53m wide and lined on both sides with nine-story houses, and the Calle stretta in Venice, which is only 0.72 m wide and contains houses six stories high! Not under southern and still less under northern skies, are such narrow streets to be approved. When new buildings are to be erected the opportunity should be used to widen even the narrowest streets to at least 6 or 7m and in laying out new streets they should never, even under the most unfavorable conditions, be less than 8 m wide. In cutting through streets where the traffic is considerable the last permissible width should be set at from 13 to 15 m. If the streets be one of the first rank a width of from 20 to 25 m is required; the Kaiser Wilhelm-Strasse in Berlin, for example, has been made 22 and 26m wide.

For the new city districts in Düsseldorf an expert report recommended street widths of 15, 20, and 26 m and in addition peripherical streets of 30m in width and more. Recently cross streets for residences of 10m width have been introduced.

In the Cologne suburbs the widths of the streets are graduated as follows: 12, 14, 16, 18, 20, 22, 26, 30m, further a varying width of from 32 to 100m for peripherical streets. Here too side streets of 8m in width have been laid out.

In Lübeck the rule is 7 to 9m for residential streets, 10m and over for secondary traffic streets, 25m for main traffic streets.

Bremen contents itself with graduations of 10, 14, and 18m as the least
In Leipzig the side streets are required to be at least 13m, the main streets at least 17m wide. 17m is also the least permissible width of the traffic streets in Hamburg. For new streets in Vienna the measurements of 15, 19 and 23m are considered practical; this is of course apart from promenades and “luxurious” streets. – In Munich 13 to 16m is the width established for residential streets, 18 to 25m for secondary and 30 to 40m for main traffic streets³.

26m is named in §15 of the Prussian flight-line law as the width up to which the cost of the street construction must be borne by the abuttors on either side, each being responsible for the area lying between his house and the centre of the roadway. This is also the greatest width required by business street-traffic under ordinary conditions.

Beyond this measure we enter the realm either of metropolitan street traffic or of “luxury,” an entirely justifiable luxury by the way, if not carried to extremes, for rows of trees and promenades benefit the whole population and even riding paths and carriage driveways for the well-to-do portion of the inhabitants cannot be dispensed with as long as that class of people is not considered superfluous.

The least width of a promenade street is 22m, as this is the narrowest on which a row of trees can be planted on either side of the street at a distance of at least from 6.00 to 6.50m from the houses. The width may increase up to 100m as will be discussed in connection with cross sections in the next chapter.

The streets in American cities, even those without rows of trees, are usually of extensive width. Residential streets are generally from 20 to 30m, traffic and business streets from 40 to 50m wide; it is true however that, as a rule, abutters are allowed to use a considerable portion of the sidewalk for business and other purposes.

In Germany in designing city plans the custom is growing of making sharper distinction than formerly between traffic and residential streets, the latter being intended to accommodate only the traffic of the residents. Whereas the width of the former is dependent on the amount of traffic that is expected to use the street, the width of the latter is determined by the height of the houses as this affects the lighting of the lower stories on the opposite side of the street. The width of residential streets may therefore be reduced to from 13 to 10m, or, if there are front gardens, to 8 m (roadway 5 m, pavements each 1.50m).

The requirements of health, as regards the width of a street, are as a rule fulfilled if the traffic conditions are properly considered, assuming that the height of the houses is in proportionate relation to the width of the street, as is provided for in most building regulations. Some regulations simply require that the houses, from the pavement to the eaves mouldings, shall not be higher than the street is wide.

Other regulations state that on narrower streets a height of, for instance, 10 or 12m is always permissible, also that no dwelling house may exceed a certain height, for example, 20 or 22m (Munich, Berlin, Cassel, Düsseldorf). The majority of the cities however take a middle course (compare fig. 108) by providing that between the absolute figures limiting the permissible height the latter may exceed by several meters (3 to 6m) the width of the street (Frankfurt, Stuttgart, Cologne, Hamburg). In Karlsruhe the greatest permissible height is one and a quarter times, in sunnier Rome one and a half times the street width. Trélat advocates making the street 1½ times as wide as the buildings are high in order to insure sufficient light in the living rooms. Modern building regulations which are graduated for different parts of the city and provide especially for more space in the new quarters than in the old city districts, show wide differences in the relation of the height of the houses to the street width in the same city.

---

4 City building regulations are constantly being developed; the figures we give have undergone various changes since 1890; nevertheless fig. 90 is probably still of fundamental value.

A leading sanitary point of view requires that the daylight shall enter every living room at an angle of 45 degrees and penetrate if possible to the wall at the back. Although it would at first appear that this demand should not be difficult to fulfill, both as regards courts and streets, yet most building regulations have been obliged, particularly in old parts of the city, to allow the construction of such small courts that it is out of the question for the light to enter the lower stories at the above angle (compare figs. 13 to 18 and 89). Frequently the requirement is not met even in the rooms of the lowest stories facing the street.

It is much more difficult, often impossible, to arrange that the direct rays of the sun shall shine into all the living rooms for at least one or two hours daily. This depends not only on the width of the streets (and courts) but still more on the direction of the street which is generally already definitely settled or governed by the traffic, and on the position of the adjoining and rear buildings. It is to be regretted that also in this respect much more attention is often paid to the size of a house and the income to be derived from it than to the sanitary requirement of sunniness. Both architects and house owners might in many cases place their houses in better positions as regards sunlight than is generally done; they would thus add much to the comfort and health of the occupants. At the same time it remains the duty of the city planner so to lay out the streets that, as far as possible, a direct northerly course is avoided. Though the sun can have but little influence in establishing the directions of the streets it should be a decisive factor in determining the position of side and rear buildings. Though the sunniness incidental to detached construction cannot be enjoyed in all parts of the city yet by paying careful attention to the above considerations the disadvantage of building in closed rows can be considerably diminished.

Extremely wide streets and extensive traffic centres are by no means an aid to sanitary conditions, as the dust from the street with its sand and particles of decaying matter are far from being healthy for the lungs, and the lack of shade is often unpleasantly felt. The houses too are apt to be very high on wide streets thus producing similar conditions as regards light and sun to those in narrower streets while the inconvenience of living in high buildings and the disadvantages attendant on density of population are increased. As a rule therefore a street should only be wide enough to provide for the traffic and for sufficient light in buildings of a moderate height.

Where, for special reasons, very wide streets and squares are laid out, public health demands that the surface not devoted to traffic shall be planted with trees or lawns, in order that it may lose its injurious character, and at the same time, the height of the buildings should be limited by police regulations.

The portion of the city area that is occupied by streets and squares usually varies between 20 and 50%; a good average is 35%. The lowest limit of 20 or

---

6 See also: De la hauteur des batiments en dehors de voies publique. Gaz. des arch. et du bat. 1878, S. 1.
25% generally indicates that the plan is incomplete, the streets too narrow or the open spaces insufficient in number or area; it may however be perfectly adequate where the blocks are large (for instance, for villas or factories) and the traffic light. The percentage increases, quite properly, where the blocks are small and the traffic streets wide. The above limit of 50% shows that the city is much cut up and the houses built in closed rows on small blocks; in some modern parts of French cities, for instance, in Geneva where the architecture is entirely French in character, the percentage of street area is even greater. To require that open spaces and streets should form a certain definite percentage of the street area would be of no great value, as the requirement could not be applied in city plans that lay out only the main lines, and the inclusion of large parks, gardens and factory settlements would defeat its object.

Beauty too demands that the width of a street be moderate. Unpleasant and gloomy as streets of 8 or 5m in width are, as a rule, unnecessarily wide streets of from 20 to 30m with little traffic and rows of low houses are just as monotonous and disagreeable. Careful graduation of the widths of the streets according to the traffic and the buildings along them is therefore necessary. A planted peripheral street, a promenade, in short all the principal streets must be clearly distinguished in their whole appearance from cross and residential streets.

Owing to local conditions it may sometimes be necessary to make a street wedge-shaped, that is, of the same width as a straight street at one and gradually diminishing along its whole length. A well-known example is the Neustädtische Hauptstrasse in Dresden (fig. 109). This might be considered an aesthetic advantage similar to that in mediaeval choirs where the tapering off of the breadth enhances the effect of the perspective. This is only true however looking along the street in one direction; viewed from the opposite direction the
Fig. 110
street of changing breadth in extension plan of Munich

Fig. 111
treet of changing width in city extensionplan of Brünn

Fig. 112
“tooth” street according to proposal of Hénard

Fig. 113
“saw” street according to Hénards proposal
effect is the reverse of beautiful. But for practical reasons a diminishing street width is often very desirable, for instance, in the merging of different flush-lines or where broad streets come together at a point of intersection.

Streets the widths of which very at different points are quite common in villages and cities that are not built according to uniform alignments this may make an impression of disorder and irregularity, but it may also produce most picturesque effects, as many mediaeval cities prove. In the hand of the designer with artistic understanding the departure from the parallel course of the street walls is an excellent means of beautifying the city. The new streets in Munich and Brünn (fig. 110, 111) may serve as examples.

Varying street widths in the geometrical forms of a “tooth” street and a “saw” street have been proposed by Hénard in Paris; (fig 112, 113) their occasional use may be advisable.

One of the most essential requirements of beauty is variety in the treatment of the streets, variety in the general form, in the width, profile and decoration. According to whether the latter is to consist simply of rows of trees, or of lawns with ornamental shrubbery, or of larger garden areas, ornamental ponds, fountains, statuary etc. the street width may be increased up to 100m and more, producing in its variations the most attractive city scenes. Examples of long streets of varying widths are the Maximilian-Strasse in Augsburg, the Boulevards in Brussels, the outlying Boulevards in Paris, the new Ringstrasse in Cologne (compare part III) to which we shall return later, and finally the Andrassy-Strasse in Budapest (see fig. 1 on the plate facing page 74).

This magnificent street with its unusual length of 2320m would have been extremely monotonous if its designers had not provided for variety in the width, in the profile and in the architecture. The first division of the street is 34.14m wide and consists of a roadway and two sidewalks with rows of trees; it is followed by a part 45.50m wide, the cross section of which shows two middle allees between three roadways. The cross section of the third part shows in addition front gardens on either side, each with a depth of 5.70m, that lead up to the final division which is lined with villas and terminates in the city park.

c) Length of Streets; Straight and Curved Streets

From the standpoint of traffic the course of a street should be as straight, or better, as visible as possible. From a sanitary point of view it is advisable carefully to limit the length of a street, if for no other reason, on account of the dust, which, because of the sharp winds that prevail in long straight streets, particularly if the latter lie in the direction from which strong winds usually blow, is especially disagreeable on such highways. Beauty also demands that a street shall not be too long. If it is to be pleasing in appearance and the traffic on it is

7 Compare: Wochenblatt für Baudenkmäler. 1886, S. 476.
not to tire but to satisfy the eye, its length must be, so to speak, a function of its width. As in the proportions of living rooms and reception rooms the relation of the length to the breadth must not be greater than 2:1, so too in city streets there are certain proportions of beauty that should not be ignored. The “Linden” in Berlin and the “Hohenzollernring” in Cologne, both of them well proportioned streets that impress one as being long but not exaggeratedly so, show the relation of the width to the length as 50m to 1000m and 36m to 700m respectively. On the well-known stretch of Boulevards in Paris, Italiens, Capucines, Madeleine, the relation is about 1:30 which may be said to exceed the limit of beauty. From an artistic point of view the relation should not be greater than 1:25 for straight streets with a steady slope, of unvarying width. We would also warn against straight streets of unvarying width that exceed 1km in length, for the eye is directed to the far end of the street where it can no longer distinguish objects. Straight streets like the Boulevards de Sébastopol and de Strasbourg in Paris, 2.30km long, the Friedrich-Strasse in Berlin, 3km long and the Rue de Lafayette in Paris which, with the Rue d’Allemagne forms a straight line of more than 4.50km, obviously overstep the bounds of beauty. The relation of the width to the length may perhaps be extended to 1:40 or even 1:50 if, as in the Andrassy-Strasse, variety is provided for in the width and profile of the street, if it has a concave slope – treated of in the next chapter – or if it is curved.

Curved streets are not subject to such strict rules as regards their length and level as straight streets, for they offer much greater variety of scene. They possess the great advantage of bringing the houses on the concave side fully into view one after another, as one passes along them, thus affording a constant change of scene. The fact that in a curved street the gaze rests
on the street fronts also gives it a more intimate, comfortable character than the long perspective of a straight street which requires some special object at its terminal point to complete it, when indeed it may be far more imposing and magnificent than a curved street. The drawback in curved streets is that the houses on the convex side are disadvantageously placed and that when the curve is sharp the traffic is less easily surveyed. In any case curved streets supply a welcome change in a straight-line scheme; it would therefore be unjustifiable to exclude them from modern city-plans. In many cases, as a means of passing from one street direction into another, where straight streets are difficult to adapt to property boundaries or to hills, where old buildings are to be preserved or villa districts laid out, slightly curved streets are both beautiful and practical. It would be absurd to make all the streets curved and just as inadvisable to set up as models to be universally imitated curved and irregular mediaeval streets, picturesque as they are. Straight and curved, regular and irregular streets are all practically and artistically justified. Everything depends on the purpose for which the streets are designed and the local conditions. If both are carefully considered and if the designer keeps the future corporeal appearance of the street in sight, the result will be not a mediaeval or Renaissance city it is true—for purposes and conditions have changed—but a similar variety and change of scene to those we enjoy so much in many old cities.

The use of a polygon line instead of a curve is unnecessary and generally ugly; a straight line instead of a curve may however be employed for the length of the individual house fronts.

Fine examples of curved streets are the...
Canale Grande in Venice, the “Anger” in Erfurt, (fig 114) the “Zeil” in Frankfurt, the Königstrasse in Nuremberg, the Maximilian-Strasse in Augsburg, the Place Meir in Antwerp, the Rue Esquermoise in Lille and the Hansaring in Cologne (see part III). A curve alone will not make a street beautiful as is clearly shown in Regents Quadrant in London where the same monotonous five-story facades are carried out the whole length of the street and even beyond the cross street.

The fact that in curved streets the concave side is so prominent, the convex side so subordinate, has led to the laying out of streets both sides of which are bent outward in a concave line so that the street is somewhat lens-shaped in form and can be decorated with lawns, statuary, fountains and such like. Local conditions may make such streets not only perfectly justifiable but even one of the chief beauties of the city. It would however be a mistake to try to carry out such exceptional schemes where local conditions are not especially suited to them. A fine modern example is the Square d’Avroy in Lüttich, designed and executed by Blonden.

The favorable conditions in Lüttich were that the west street front was already in existence, that the curved east front forms the extension of the Guillemins-Strasse leading to the station and further that the lens-shaped garden area occupies principally the place of a former basin for boating. Also the new concave street front on the bank of the Maas in the same figure is effective. – Antwerp possesses a grand concave street on the bank of the Schelde; the concave street along the bank of the Rhine in Cologne has recently been designed by the author.

In 1878, following the Lüttich model, the author proposed in the Dresden Building Plan Competition, a doubly concave street whose west roadway forms the extension of the Elbe bridge while its contraction at the opposite end is naturally brought about by its introduction into the Albert-Platz (fig. 109). In carrying out this plan it would be easy so to alter it that not only the Hauptstrasse but also the Neue Strasse and the Königstrasse would be included.

The main streets (Föutcza) in Kaschau in Upper Hungary (fig. 115) is somewhat similar in outline and is made particularly attractive by using the strip in the middle for the erection of public buildings, especially the cathedral.

In the Middle Ages and in the period immediately following them the custom of placing fountains and monuments in the centre of broad streets was very popular. One of the finest examples of this sort is the Maximilian-Strasse in Augsburg, the building line on one side of which is concave whereas that on the other is straighter and leaves just space enough for two fountains.

---

8 Faksimile-Reprint .after: Zeitschrift des Architektur u. Ingenieur Vereins zu Hannover 1878, Bl. 743.


Henrici, K. Konkurrenzentwurf zu der nordwestlichen Stadterweiterung von Dessau etc. Aachen 1890.
PART II

CHAPTER 3:
Longitudinal and Cross Sections of Streets

a) Longitudinal Profile

The longitudinal profile of city streets must take into account the requirements of suitability and beauty. The considerations of suitability refer to traffic, drainage and building.

Traffic demands that the streets shall be no steeper than is necessary. According to the orders of the Prussian Department of Public Works for putting into effect the flush-line act of May 28, 1876, in main traffic streets a descent of not more than 1:50, in secondary traffic streets, of considerable length, a descent of not more than 1:40, is to be aimed at. In planning the expansion of cities where the country is flat or on the plain in a valley, such gradient relations will be found necessary only in exceptional cases, for instance, at railway crossings or where there are other local obstacles. As a rule a descent of from 1:100 to 1:80 will be sufficient. A greater descent than 1:70 carries with it the disadvantage that it is not admissible to pave such a steep street with asphalt. In cities situated in a hilly or mountainous country ascents of up to 1:25 or 1:20 often cannot be avoided even in the principal streets; in the side streets ascents of even 1:8 have to be put up with and sometimes flights of steps have to be used to connect the different levels.

From a financial point of view the longitudinal profile of a street should be so established that the annual cost of interest, cancellation, maintenance and transport is kept at a minimum.

Drainage requires that the streets should not be too flat. A longitudinal descent of from 1:200 to 1:400, according to the nature of the surface of the road, is regarded as the least admissible descent of the side gutters. Streets that are flatter absolutely require subterranean drainage and such an arrangement of the
gutters that their slope is broken and inclines more towards the openings into the drains than does the general slope of the street.

In order not to render construction unnecessarily difficult the level of the centre of the street should not be too high above the building land. A practical difference between the bottom of the building block and the middle of the street is from 1 to 2m as the earth dug out of the cellar and foundation excavation can then be used to raise the yard or court and the garden. If in order to satisfy other requirements it is found necessary to cut the streets into the earth (in Marseilles there are streets cut into the rock to a depth of 15m) or to raise the middle of the street more than 2m above the land (in laying out the suburbs of Cologne some streets were raised to a height of 6m), these are disadvantages that have to be put up with for the sake of gaining certain advantages, for instance, immunity from high water, proper sewerage, suitable gradients etc. or in order to avoid worse evils. Only under such conditions is it permissible to make city streets of such levels.

The aspect of beauty is just as important in determining the longitudinal profile of a city street, for it influences the perspective view of the street to the same degree as the latter’s position, direction, width and length, or even to greater extent than these.

The finest level is a concave one (fig. 116), that passes from a horizontal level or slight slope into a steeper slope. Whereas on a steadily descending or ascending street the more distant objects on or beside the street are hidden from the eye by nearer objects, on a street with a concave profile things at a distance are separated from nearer objects in whichever direction the street is travelled. If the “head of the street is raised” the latter looks statelier, the scene is richer, the perspective more effective, the traffic more easily surveyed. The length of the street, that is, the proportion of the length to the width, may exceed, on this kind of street, the relation of 1:30, recommended under marginal heading 130, because from whichever direction the street is viewed, its end is more clearly seen. The Avenue des Champs Elysées leading from the Triumphal Arch to the Place de la Concorde in Paris and the Rue Lafayette leading down from St. Vincent de
Paul are magnificent examples of streets with concave levels. Other examples of this sort are the Boulevard du Jardin botanique and the Boulevard du Midi in Brussels, the Via Nazionale in Rome, the Via Rome in Genoa and the Olga-Strasse Stuttgart. A concave level is also very effective in large open squares, for instance St. Peter’s Square in Rome which will be described in chapter 6 of this part.

It is an uncommonly attractive scene in the evening to follow the garland-like lines of the lanterns on such a gently sloping street, between which, if there is much traffic, a swarm of carriage lamps flits back and forth; the effect on the Champs Elysees, for instance, is at times marvelous.

An evenly ascending or horizontal street looks stiff and empty in comparison. Just as a straight street continued for miles without a curve makes an unsatisfying impression, as if, for instance, the city had been cut in two with a knife, like a cake, and the portions pushed slightly apart, so too a straight street of considerable length with no change of slope is unattractive and wearisome. Many modern streets owe their monotonous, uniform appearance as much to this as to the straight unbroken line of the houses.

The street with a steady slope might be called aesthetically neutral; but
if the level is convex, that is, if a ridge is formed in the longitudinal profile of the street, the effect is positively ugly. The surface of the street is seen only to the top of the ridge; beyond that point it disappears or is suddenly foreshortened (fig. 117). Examples are: the Theaterstrasse in Aachen, the Königstrasse in Altona, the Königstrasse in Stuttgart, the Boulevard de la République in Marseilles and a number of streets in the southern part of Darmstadt which are laid out in straight lines up hill and down dale (Heinrich-, Wilhelminen-, Hügelstrasse). Cities in American are generally laid out with even less regard to the hills. In old San Francisco for instance the ugly street formation described above is very common. Beyond the line of the ridge the houses look as if they were sinking into the ground. People and vehicles on the other side of the rise are only partially visible. As at sea the top of the distant object is seen first. We catch sight of a man’s head, then the upper part of his body becomes visible, then the lower part; the legs are not seen until one is near enough to the top of the ridge to look over it. As, according to this the first ridge cuts off, to a certain extent, the view of the street, it is clear that it can afford no effective perspective; in any case the perspective view must suffer considerably. Where such convex slopes are unavoidable they should at least be so treated that a man standing upright can see the surface of
the street beyond the top of the ridge. In plans for city expansion however, it is far better to lessen the unpleasant effect of the unavoidable ridge either by curving the street (fig. 118), or by bending or dividing it at the top of the ridge (fig. 119, 120). Setting the building line farther back, without interfering with the traffic, may also help to lessen the unsightly effect (fig. 118, 121). The necessity of changing the direction of the street at the top of the ridge will perhaps bring the altered part into the line of another street or an interesting fork may be formed; in short, another, perhaps charming, grouping of the city-plan takes place. Curving the street makes the slope less striking; under certain conditions it ceases to be noticeable at all. The division may be either in a horizontal place, by forking (fig. 120), or in a perpendicular plane by so developing and emphasizing the summit of the ridge that the eye rests there and the farther view is closed. In order to do this it is advisable to combine the summit of the slope with a street intersection or widening of the street so that the erection of a suitable fountain, monument, look-out mount, terrace, or something similar is possible. As an example may be mentioned the connection of the Karolingerring with the Sachsenring in Cologne, where a pleasing effect has been produced by placing a mound, which is to serve as the site of a monument, on the summit of the slope (fig. 122). A much finer example however is the triumphal arch on the Place de l’Etoile in Paris which stands not only at the terminal point of the streets directed towards it but also at their summit. (Compare fig. 36911).

b) Cross Sections

The value and rank of a city street is most clearly expressed in the treatment of its transverse profile. Hence the choice of the latter is an important problem, in the solution of which all local conditions must be carefully taken into account. Apart from walks and glass-covered passages which are horizontal across their full width, and should be so as far as possible along their length, as well as very insignificant lanes and “courts” which are provided merely with one flat gutter in the middle, all city streets up to from 25 to 30m in width are usually divided into a roadway in the middle and a sidewalk on either side. Some Italian cities form an exception either by paving the whole surface of the street with marble without separating the sidewalks from the roadway, like Genoa and Palermo, or, like Turin and Milan, where the streets are paved with rubble-stones in which, and on the

---

Fig. 102.

Fig. 103.

Fig. 104.

Fig. 105.

Fig. 106.

Fig. 107.

Fig. 108.

Fig. 109.

Fig. 110.

Straßen-Querprofile.

Figs. 126 - 134
Street cross-sections
same level, are tracks or roads of marble or granite flagging which serve partly for foot-passengers, partly for the carriage wheels. The gutters are so distributed between these flagged tracks that each division of the street is separately drained in the middle. (figs. 222, 223, 228 and 229)

As a rule however the walks are raised from 9 to 16 cm above the roadway and are bordered with curbstones. In Germany the raised walk is called Bürgersteig, in France trottoir, in England simply footway. The purpose of raising it is to prevent vehicles from driving onto it, to provide a particularly smooth and safe way for pedestrians and to protect the houses from being struck by the wheels of vehicles. In common streets with heavy traffic the sidewalks generally occupy b, 1/5, the roadway f, that is 3/5 of the street width s, thus b = s/5 and f = 3/5s. Where the traffic is lighter it is advisable to reduce the roadway to one half of the street width, the sidewalks to a quarter, thus b = s/4 and f = s/2. This arrangement combines economy in the cost of construction with a pleasant aspect (figs. 123 -125).

Another factor in determining the width of the roadway is the number of vehicles abreast that it should accommodate. If we assume the average width of the track of a dray (measured from the outer edge of one wheel to the outer edge of the other) to be 1.80 m, the width of the load to be 2.30 m, or allowing room to pass, 2.50 m, we find, if the load is not to project over the sidewalk, that 2.50 m is the least admissible width for a single-track roadway, 5.00 m for a double track and 7.50 m for a triple track roadway that contains space not only for two vehicles to meet and pass but also for a third to stand still at the same time. A four-track roadway requires a width of up to 10.00 m. This measure is also the least that will accommodate double street railway tracks and still leave room on either side next the sidewalks for the traffic or ordinary vehicles; thus with a sidewalk width of from 3 to 4 m such a street is at least from 16 to 18 m wide.

As however a large number of narrower vehicles, particularly cabs and handcarts, travel on the streets and as, in addition, the traffic can move with greater safety if the tracks do not lie too close together, all the roadway widths lying between the extremes mentioned have their purposes and justification. In old cities the measurements given above may be still slightly reduced if necessary, the double track roadway to 4.50 m, the triple track to 7.00 m, if the narrowness
of the environs is such that one is obliged to take advantage of the fact that, in order to pass another, a dray may proceed with the wheel close to the edge of the sidewalk and the load projecting slightly over it, that is, that it may claim a strip of the sidewalk amounting to \((2.30 - 1.80)/2 = 0.25\).

Assuming the relation to be \(b = s/4\) to \(s/5\) streets of 18m in width are equipped with fairly broad sidewalks; with a street width of 20m it is already possible to plan rows of trees along the edges of the sidewalks. It is true however that trees cannot be expected to thrive on streets that are less than from 22 to 26m wide; on a narrower street the rows must frequently be replanted and the trees will not develop such beautiful forms (fig. 126).

It is more sure therefore in streets of from 20 to 23m in width to plant a single row of trees on the sunny side or along an approximately middle line, a method that gives rise to the unsymmetrical cross sections shown in figs. 127.
to 129. The footway in the middle in fig. 129 is convenient from which to enter street cars or cabs; for walking a wider path in the middle is advisable as shown in fig. 130. This gives us however a street width of 26m which allows two rows of trees to be planted, arranged either symmetrically or unsymmetrically as desired (figs. 131 to 133). Fig. 131 is the typical street with two rows of trees on either side of a middle walk; fig. 132 shows the trees along the edges of the sidewalks to which front garden plots are added in fig. 133. The average distance of the trees from one another and from the buildings is 7m. On walks of 6m in width, which are very pleasant if the traffic is light, the distance in the long direction between the trees should be from 8 to 9m (fig. 131).

If the sidewalk is broad enough to accommodate two rows of trees we have the contre allée so popular in French cities. It is usually a gravel walk above which the ordinary sidewalk is raised by a curbstone with a gutter (fig. 135). Even with only one row of trees on either side of the street a strip is frequently separated from the sidewalk in France (fig. 134) which, however, is only to be recommended if the strip is used for some special purpose, as, for instance, bicycling.

Streets with two rows of trees on either side require a width of 40m, for a middle walk with three rows of trees (between two roadways) a street width of 44m, for two middle walks with two rows of trees each (between three roadways) one of 50m may be considered the average (figs. 135 to 137). A middle walk with four rows of trees is shown in fig. 138.
It is clear that a great variety of symmetrical and unsymmetrical street profiles can be produced by the different arrangement and number of the rows of trees and especially by combinations of middle and side walks and the introduction of bicycle paths, lawns or ornamental shrubbery. Symmetrical treatment is by no means essential everywhere; it depends on the character and architecture of the properties along the street. If, for instance, one side of a street is lined with houses, the other bordered by a park, rows of trees may be planted along the latter, while a broad, free sidewalk is generally to be preferred in front of the houses. Unsymmetrical treatment is equally appropriate if one side of a street is occupied principally by business houses and shops and the other by private houses – an arrangement that is not unusual on wide peripherical streets (for instance in Brussels). Streets on one side of which the houses are detached while those on the opposite side are built in closed rows may be similarly treated; also streets on river banks, panorama-
streets etc. For streets that are alike on both sides, especially for extensive radial streets, avenues and other main highways symmetrical treatment is, as a rule, to be preferred.

A remarkable difference is produced by middle and side walks with trees. The former are more popular in Germany and Belgium, the latter in France. The advantage of placing the walks on the side is that the traffic on the broad middle roadway is more easily surveyed and the effect produced by the street and the traffic is more unified and impressive. On the other hand the fact that when the trees have grown large they partly conceal the facades of the houses and that the distance from a vehicle at the curb to the house is unnecessarily lengthened both for people and goods, speaks against side walks with rows of trees.

Profiles of streets with middle walks are less stately in appearance but more convenient both for walking and for the occupants of the houses; the view of the latter is also unobstructed. In designing and laying out city districts however neither method of planting in rows should be used exclusively, as uniformity is to be avoided. Besides, a broad, undivided roadway is more important in one street, pleasant ways for walking and riding in another.

A short explanation of the cross section illustrated in figs. 139 to 238 will aid in understanding the peculiarities, drawbacks and advantages of certain treatments.

Of the three Berlin streets in figs. 139 to 141 the Landgrafenstrasse has
front garden plots and sidewalks with rows of trees, the Bülow-Strasse a middle walk and front garden plots, “Unter den Linden” had formerly four now only two rows of trees in the street and a riding way to the north of it. – An entirely modern streets profile is shown in the Bismarck-Strasse (50m wide) in Charlottenburg (fig. 142). It has one main and two side driveways, a separate riding path and a special division for two street-railway tracks. There are strips of grass between and beside the tracks. The electric underground railway runs underneath the main carriage way.

The profiles of two streets in Königsberg are shown in figs. 143 and 144. Both are suitable for moderate traffic conditions.

The Palmaille in Altona (fig. 145) is laid out like Unter den Linden but is little more than half as wide. The four-meter promenades on the sides as well as the roadways and
sidewalks are decidedly too narrow; the trees cannot be expected to thrive.

A beautiful treatment intended less for heavy traffic than for people on foot is shown in the Esplanade in Hamburg (fig. 146). In the same city a street designed for heavy traffic, the Reeperbahn, is shown in fig. 147. The main roadway is 15m wide; the profile of the street is unsymmetrical, showing on the north side a contre allée, rarely seen in Germany, the outside row of trees, which is unfortunately too close to the houses; on the south side a special division of the street, 12m wide, is reserved for market booths and side-shows.

The Bahnhofstrasse in Hannover (fig. 148) is laid out on too small a scale; the walk in the middle and the roadways are too narrow; owing to a lack of curbstones the trees are frequently bruised. In this case a middle roadway of about 13m in width and sidewalks with rows of trees would be prettier and more
serviceable.

The Westwall and Ostwall in Dortmund (fig. 149) show a pretty arrangement for light traffic; the combination of rows of trees with a slightly sunk garden area on the Westwall is very attractive.

The Alleestrasse in Düsseldorf (fig. 150) possesses a broad main roadway on the one side, a narrower one on the other; the wide walks in the middle form an exceedingly pleasant promenade. Asphalt pavement for the roadway has since taken the place of the macadam.

On the Monheimsallée, a part of the Ringstrasse in Aachen (fig. 151), the roadways are also of different widths to correspond to the amount of traffic on each. The garden area in the centre is beautiful but would be much more so if it were sunk below the level of the walks.
Two beautiful, unsymmetrical cross sections are seen in Wiesbaden in the Wilhelm-Strasse with its riding path and walk along the Kurpark (fig. 152), and the Röder-Strasse with a contre allée and front garden plots on one side (fig. 153). The Adolfs-Allée (fig. 154) shows a stately division into three roadways with two middle walks and in addition front garden plots of 8m in depth on either side, all within a width of 54m; the measurements used, which are sufficient only for a medium amount of traffic, are the lowest admissible for a street treated in this manner.

The unsymmetrical profile of the Ringstrasse in Frankfurt a. M along the Untermainanlage (fig. 155) is most practically carried out; the walk is in the pleasantest, the riding path in the most unobtrusive situation. There
would be room for a row of trees on the sidewalk in front of the garden plots but it would interfere with the view of the park from the houses and of the houses from the park.

The Kaiserstrasse in Mainz (fig. 156) is similar to the Monheimsallée in Aachen, but is symmetrically treated, so that the carriage and foot traffic can be equally distributed. The sunken garden area is most effective; the lower level of the roadways on the right side is only temporary until it can be permanently paved.

The profile of the Ringstrasse in Mannheim (fig. 157) is similar, but its dimensions are too small for greater traffic.
Fig. 165
Hohenheimer Street in Stuttgart

Fig. 166
Ludwig Street in Würzburg

Fig. 167
Maximilian Street in Munich

Fig. 168
Street cross-sections: Extended Maximilian Street in Munich

Fig. 169
Ring Street in Vienna

Fig. 170
Via dell’Acquedotto in Triest
Serviceable street profiles of 30m in width taken from the city expansion in Strassburg are shown in fig. 158, with a pleasant middle promenade, and fig. 159 in which the sidewalks are planted with trees and there is a broad roadway in the middle. The cross section of the most important promenade in the old city of Strassburg is also of interest, the Broglie-Platz (fig. 160), which shows a roadway on one side of the broad promenade in the middle and on the other a sidewalk of 6m in width in front of the gardens belonging to the cafés.

Narrower streets planted with trees, in Freiburg i. B., are shown in figs. 161 and 162. The outer Kaiserstrasse which is 21m wide shows the sidewalk divided into a flagged walk and a gravel strip planted with trees. The Eisenbahnstrasse (27m wide) has broad front garden plots of 5.50m in width on both sides. Only in front of the post office is their place taken by a paved front square for the sake of the traffic.

The Königstrasse in Stuttgart (fig. 163) is 24.80m wide and is not planted with trees; the lively traffic and the nearness of the houses would not admit of the latter but the width of the sidewalks might very well be increased from their present 4.40m to from 5.50 to 6m. An attractive profile for light traffic is that of the Olga-Strasse (fig. 164) which is ornamented with front garden plots. The trees on the double sidewalks of the Hohenheimerstrasse (fig. 165) cannot be expected to live as they are only 4m apart; as the whole street is only 28.60m wide one row of trees on each side would have been sufficient and the width of the roadway might then have been somewhat increased.

The profile of the Ludwig-Strasse in Würzburg (26m wide) is well conceived; a somewhat greater depth for the front garden plots would have been desirable however (fig. 166).

The portion of the Maximilian-Strasse in Munich shown in fig. 167 is 23m wide and affords an example of the frequently occurring improper planting of trees; these should be planted not on the roadway but on the sidewalk, at a distance of from 70 to 120cm from the edge of the curbstone, so that they will not be destroyed by vehicles and that dirt will not collect around them. Protecting the trees by surrounding them with stone is not enough, apart from the fact that such stones are ugly and an inconvenience to traffic. The improper placing of trees is also to be seen in that part of the Maximilian-Strasse that is 83m wide. Except for this defect it shows a very stately profile (fig. 168). The side roads are connected at many points with the middle roadway; the whole street would look still more cheerful if the garden areas were slightly sunk.

The Ringstrasse in Vienna (fig. 169) is one of the most magnificent city streets in existence; the profile, which consists of three roadways and two middle allées is stately and practical. One allée serves for walking, the other for riding. The whole treatment will be more fully described elsewhere.

The Via dell’ Acquedotto in Trieste (fig. 170) is one of the narrowest promenade streets, being only 21m wide; the roadways, which, in contrast to
Fig. 171
New Ring Street in Budapest

Fig. 172
Andrássy Street in Budapest

Fig. 173
Tisza-Lajos Ring Street in Szegedin

Fig. 174
Street cross-section: Older Ring Street in Copenhagen
fig. 161, lie at the sides, are too narrow, in consequence of which the trees also suffer.

The Ringstrasse in Budapest (fig. 171) has sidewalks planted with trees which, in the interest of the latter, might have been made wider than 6.50m, as the roadway is wide enough and to spare. The cross sectional arrangement of the Andrassy-Strasse in the same city is excellent (fig. 172).

The Tisza-Lajos-Ringstrasse in Szegedin (fig. 173) is not practically arranged in that the outer row of trees on the two sidewalks stand too near to the houses as well as to the inner rows of trees; they should be removed so that at least the young trees in the inner rows might thrive.

The Ringstrassen in Copenhagen (figs. 174 & 175) are distinguished by the arrangement of the rows of trees on them, their width and side roadways being the same. The roadways might be wider; otherwise the arrangement of the new Ringstrasse, is excellent for a street in which it is desirable to provide a special track for riders. – Unusual but stately are the profiles of the Friedrichsbergalles (fig. 177) and the Strasse Osterbro-Gade (fig. 178), though they afford an excellent example of the disadvantage arising from the very wide
Fig. 177
Friedrichsberg-Allee in Copenhagen

Fig. 178
Østerbrogade in Copenhagen

Fig. 179
Sophie-Laan in Haag

Fig. 180
Willem Street in Breda

Fig. 181
Chausée de Malines in Antwerpen
sidewalks which increase the distance between the houses and the roadway.

The two streets in The Hague (figs. 176 & 179) are prettily arranged but suitable only for light traffic. For the sake of clearness the ground-plan is also given in fig. 176.

The Wilhemstrasse in Breda (fig. 180), the garden area in the middle of which is broken by the necessary cross-roads, is also only suited to light traffic.

An unsymmetrical profile, the ground-plan of which will be given later, is shown in the Chaussée de Malines in Antwerp (fig. 181 a,b). The profile of the Boulevard Leopold in the same city (fig. 182) has not proved practical; the distance of 5m between the trees is not great enough; the latter must therefore be clipped from time to time and kept artificially slender; the roadways and walks are also too narrow. The plan for changing the profile of the street and making it one with a single promenade in the middle, has probably already been carried out. The arrangement of the Hauptringstrasse (60m wide) is very stately. The wide roadway in the middle, the two walks and the narrower side roadways are excellently adapted to metropolitan traffic (fig. 183). It is to be regretted that in Antwerp, as in Vienna, the profile of the Ringstrasse remains the same for its whole length of several kilometers.

In figs. 184 and 185 the cross sections of the Ringstrasse in Gent with a width of 40m are shown; the unsymmetrical one is the more interesting. The middle promenade (15m wide) of the other will look bare until the trees have grown very large unless, for the present at least, a strip of lawn with shrubbery and flower beds is laid out on the axis of the street.

Brussels possesses a great variety of beautiful street profiles. Fig. 186 shows the Boulevard Central or Anspach which has been cut through the old
Fig. 184
Boulevard of the Citadelle in Gent

Fig. 185
Boulevard of the Hospice in Gent

Fig. 186
Boulevard Central in Brussels

Fig. 187
Boulevard de Waterloo in Brussels

Fig. 188
Boulevard de l'Observation in Brussels
city; it is 32m wide and without trees; the sidewalks might easily have been made somewhat wider. Figs. 138 187 to 189 illustrate the variety of the east Ringstrasse. In each instance it was found feasible to separate the walks, bicycle paths, riding paths and driveways from the ordinary sidewalks and roadways for heavy traffic.

Several magnificent streets in Lüttich, all of which are more or less unsymmetrical, have already been shown. An interesting proceeding is the planting of a narrower walk with young trees beside the wide one with old trees on the Quai Cockerill, also the omission of the trees on the new east side of the
Fig. 191
Grabengasse in Winterthur

Fig. 192
Bahnhofstrasse in Zurich

Fig. 193
Bahnhof Street in Ragaz

Fig. 194
Boulevard St. Gervais in Geneva

Fig. 195
Boulevard des philosophes in Geneva

Fig. 196
Boulevard du théâtre in Geneva

Fig. 197
Street cross-section: Cours de Rive in Geneva

Fig. 198
Boulevard Haussmann (and other Boulevards) in Paris
Square d’Avroi so that an unobstructed view of the garden area may be obtained from the houses.

A cheerful suburban street in Basel is shown in fig. 190; the division
between the footway and the roadway is a strip of grass with flower-beds under the row of trees. The charming Ringstrasse in Basel will be discussed later. – Fig 191 shows a simple and pretty street in Winterthur, with a middle walk; fig. 192 a somewhat crowded arrangement of rows of trees on the sidewalks, in Zürich; fig. 193 a street in Ragaz of only 12m in width with rows of trees; this is the narrowest possible width for such an arrangement and is of course unsuitable in larger cities; the houses on both sides are detached.
Among the streets in Geneva (figs. 194 to 197) those are most striking that show the unusual arrangement of a footway along the axis of the street with one row of trees (fig. 196) and the broad, free corso arrangement in fig. 197.

In regard to the treatment of streets, Paris, more than any other city of modern times, serves as a model. It affords an abundance of practical and attractive examples; a few only are given in figs. 198 to 204. Fig. 198 is the common profile of a traffic street running through the centre of the city; figs. 199 and 200 are streets in one of the finer out districts; figs. 202 and 203 are outlying boulevards. It is doubtful whether the trees standing nearest the houses on the Boulevard d’Italie will thrive will. Fig. 204 shows the unusually wide and free profile of the promenade street leading from the Champs Elysées to the triumphal arch, on which the traffic is generally very great.

The street St. Sauveur in Lille (fig. 205) is too narrow (21m) for trees where the traffic is so heavy, as their condition plainly shows in this case. The Lille streets Nationale and de la Gare, without trees, are therefore much statelier. There is no fault to be found with the streets laid out according to fig. 207 if they are intended to accommodate considerable traffic.

Fig. 208 is a street of moderate width in Rouen; figs. 209 and 210 are examples of streets in the same city, with promenades along the sides. Figs. 211, 212 and 214 are streets with trees on the sidewalks and side promenades, in the neighboring town of Le Havre. The Cours du Midi in Lyon, shown in fig. 213 is also used for public shows; it is 125m wide. Two extremely wide portions of the Ringstrasse in Nîmes are shown in fig. 215. There is little traffic on this street which is lined with low houses. The street leading to the railway station, shown in fig. 216 might also be somewhat narrower; yet its appearance is pleasanter because the houses are higher and the traffic areas better distributed.

Beautiful streets in Marseilles are given in figs. 217 to 219. The Cours Belsunce is much used for walking; the Avenue de Meilhan the greater part of which is lined with front garden plots, is finer, but the stateliest of all is the Cours du Prado which is splendidly arranged for carriages, riders and foot passengers. The Rue Longchamps (fig. 220) is very narrow for the rows of trees which are otherwise well cared for. The same profile might be desired for it that is seen in
Fig. 206
*Rue de la Gare and Rue Nationale* in Lille

Fig. 207
*Boulevard de la Liberté* (and other Boulevards) in Lille

Fig. 208
*Rue de Crosne* in Rouen

Fig. 209
*Boulevard Cauchoise* in Rouen

Fig. 210
*Boulevard du Mont Ribondet* in Rouen

Fig. 211
*Boulevard de Strasbourg* in Le Havre

Fig. 212
*Cours de la République* in Le Havre
the station street in Nice (fig. 225).

In Italy rows of trees in the streets are less frequent. In order to obtain shade it is preferred to limit the width of the street and to place the sidewalks under arcades. In the latter case there are no raised footways on the real width of the street and they are not always found even where there are no arcades. Fig. 228 shows the usual Turin street without, figs. 222 and 223 with arcades; the flags for driving on and those constituting the footways are laid in the street pavement. Figs. 221 and 224 show the stately Corso Vittorio Emanuele and Corsc Regina Margherita in Turin. Similar cross sections of streets in Milan are shown in figs. 226, 229, 230 and 233, all without trees\(^\text{12}\). In Genoa some of the streets are paved across their whole width with marble blocks, others have ordinary raised sidewalks in front of the houses, more rarely arcades. In Florence ordinary sidewalks predominate; the Viale Principe Eugenio (Amadeo and Margherita) have rows of trees which, owing to their unskillful arrangement, do not provide shade (fig. 231). In contrast to this the really imposing arrangement of the Galleria degli Uffizi must not remain unmentioned; it is approximately 150m long, 19 wide and is bordered by the colonnades of the well-known Uffizi on the long sides and at one end; carriages can enter at the open end; the arches at the other end form a portal through which the Lungarno

\(^{12}\text{The tracks of the street railways shown in the figures do not, of course, project above the street pavement.}\)
is entered; steps separate the colonnades from the roadway.

The old streets in Rome are generally paved across their entire narrow
width with cobble stones; ashlar stones laid obliquely on the same level as the roadway serve to mark the footway. Only a few Roman streets, like the Corso and the Via de’Condotti possess ordinary sidewalks like ours (fig. 227). The recently cut through extension of the Via Nazionale has fairly well kept rows of trees (fig. 232); several streets in the new part of the city are treated like fig. 236, with double walks on both sides, the outer row of trees on which will have to be sacrificed when the houses are built.

Several London streets are illustrated in figs. 234, 235, 237 and 238. The simple profile of Farringdon Street (fig. 237) is found in nearly all the traffic streets of London, generally with a width of from 15 to 30m; only very rarely are young rows of trees seen on the sidewalks, as shown in fig. 235. An example of a street in a “square” such as are very numerous, is shown in fig. 234; the houses, with small yards in front of them, lie on the outer side of the street which surrounds a square or round common enclosed garden. As rich as London is in
Fig. 221
Corso Vittorio Emanuele in Turin

Fig. 222
Via Massini in Turin

Fig. 223
Via di Po in Turin

Fig. 224
Corso Regina Margherita in Turin
Fig. 225
Bahnhof Street in Nice

Fig. 226
Corso Vittorio Emanuele in Milan

Fig. 227
Corso in Rome

Fig. 228
Via San Domenico in Turin

Fig. 229
Corso Venezia in Milan

Fig. 230
Via Broletto in Milan

Fig. 231
Viale Principe Eugenio (Amadeo and Margherita) in Florence

Fig. 232
Street cross-section: Via nazionale in Rome

Fig. 233
Street in Milan
parks and squares, it is very poor in stately promenades and handsome streets with rows of trees and other vegetation. Boulevards and avenues such as are found in Paris are almost entirely lacking. Many streets have been cut through in the city and the West End but only the requirements of traffic were considered. People who walk or drive for pleasure, and riders find the only suitable streets to be those beside or in the parks, of which the Mall, the approach to Buckingham Palace, leading through St. James Park, is an eminent example (fig. 238).
Fig. 238
Street cross-section: The Mall in London
PART II

CHAPTER 4: Special Kinds of Streets

Local conditions often make it necessary to introduce into the plans of new city districts, or the old city, streets of a special kind that differ in some way from those discussed in the preceding chapter. Among these are streets with houses on only one side, hillside streets, double streets, streets with steps, ascents and, finally, streets on which the footways are either considerably higher or lower than the roadways.

Streets with front garden plots, that is streets in which the building line is set back from the street line, and streets in which horticultural treatment predominates, are discussed in detail in part VI.

Streets with houses on only one side are found on the banks of rivers or other bodies of water, along the borders of parks and public squares. They also occur on the slopes of hills where one side of the street is too steep to be built on or is purposely left open in order to afford a free view. All these streets are built like ordinary ones on the side where the houses stand whereas the treatment of the opposite side depends on local conditions.

The arrangement of the water side of quay streets (wharves, docks, banks, shores etc.) depends on the requirements of shipping and therefore comes under the head of waterfront construction. We only need to mention here that, in all cases, that part of the street that is used for general traffic should, if possible, be separated in some way from the actual quay traffic. If the bank is not used for shipping, or only for passenger boats, the street along the waterfront is generally laid out as a promenade.

Various examples are shown in figs. 239 to 259.

On the side next the land the Victoria Embankment in London (fig. 239) is partly lined with buildings, partly with garden areas, the Embankment Gardens, while a wide footway leads along the side next the Thames.

The Jungfernstieg in Hamburg, formerly 30m wide but which has recently been broadened, is known as a much travelled street and promenade on the water side of which the Alster boats dock (fig. 240). The Königsallee in Düsseldorf (fig. 241) shows a favorite walk on the side next the former fortification ditch; there is little traffic on the Kanalstrasse lying opposite.

The Leyenstapel in Cologne (fig. 242) shows the separation of the ordinary city traffic from that along the bank of the Rhine. On the Rheinuferstrasse in Mainz (figs. 243 & 244) the city roadway, the promenade for foot passengers and the Rheinwerft are still more distinctly separated from one another. The
Fig. 239
Victoria Embankment in London

Fig. 240
Jungfernstieg in Hamburg

Fig. 241
Street profile from Düsseldorf (Königsallee and Canal Street): Quai Streets
Schaumainkai in Frankfurt a. M. (fig. 245) is similarly treated.

The five waterfront streets shown in figs. 246 to 250 show various arrangements in Zürich which is very rich in bodies of water; on the Limmat-promenade and the Kasernenstrasse the rows of trees on the water side stand in
Fig. 245
Schaumain Quai in Frankfurt a.M.

Fig. 246
Platzspitz Promenade in Zurich

Fig. 247
Casernen Street in Zurich

Fig. 248
Geßner Alleé in Zurich
grass borders which at the same time form a practical division between the street and the water. The Gessner-Allee and the new Alpenkai are very much alike; the Uto-Kai shows the separation of the quay street from the city highway.

If the trees are not to obstruct the view of the water from the houses on the land side of the street, their tops are cut, as if often seen in the Rhine towns where the streets along the banks of the river are ornamented with low, bushy, bower-like walks. Figs. 251 to 253 are examples in Lütich, Paris and Lyon with paths and roads lying along the lower level of the river banks; the quay along the Seine in Rouen (fig. 254) shows city and wharf traffic separated but on the same level. The Rhone Quay in Arles (fig. 255) shows a peculiar arrangement in that the sidewalk of the highway is raised on steps and thus separated from the quay street and protected from high water. The Lungarno in Florence (fig. 256) has not only a raised sidewalk on the water side but the sidewalk itself
is covered by a two-story colonnade called the Galleria Pitti which connects the Uffizi with the gallery of the Ponte Vecchio and thus with the other bank of the river. In Rome, where the banks of the Tiber have hitherto remained in the most neglected state imaginable, the Lungo Tevere (fig. 257) is now being constructed, with an uncovered footway on the side next to the water and a colonnade on the opposite side.

Streets along the seashore in Ostende and Nice are shown in figs. 258 and 259. On the former the broad promenade without trees is protected on the side next the sea by a low parapet; in the latter rows of trees standing in shrubbery border the promenade.

Streets that border on parks and public squares may be treated with just as great variety.

Examples in Wiesbaden, Frankfurt a. M. and Zürich have already been given in figs. 152, 155 and 246. A magnificent example is seen in the Boulevard du Jardin botanique in Brussels (fig. 260) where, from the height of the footway one can look down into the beautifully cultivated botanical garden. The “Nizza”, a garden area lying on the lower Rhine in Frankfurt, may be compared to this, where a fine view is obtained looking down from the street along the banks of the Main. The Bastione di Porta Venezia in Milan (fig. 263) is somewhat similar, dipping in places into the public garden and in others affording a view of the outer boulevard that leads round the old fort ditch. The Boulevard St. Charles in Amiens (fig. 261) belongs to the same group of streets. It bears some resemblance to the street shown in fig. 241, but the place of the ditch in the latter is taken in fig. 261 by a railway excavation the slopes of which are decorated in places with
vegetation. Frequently in cities railway excavations may be combined with such promenade streets if, from the outset, the plans are made with this end in view.

Merely in order to make the examples complete and for later reference, two illustrations of city promenade streets are added, in figs. 262 and 264, which are not intended to be built on and would therefore properly belong to the parkways. They are somewhat similarly treated in the division of the ways and of the grass and shrubbery about the trees, but the Stradone delle Cascine in Florence is double the width of the Promenadenstrasse in Baden-Baden.

The construction of streets with houses on only one side on the slopes of hills or mountains is sketched in figs. 265, 266 and 268. The houses are sometimes placed on the upper, sometimes on the lower side. The former arrangement is
to be preferred in city building-plans because the view remains unobstructed for people passing through the street and also because the fronts not the backs of the houses are then seen in looking up from the valley. As a rule however, the other arrangement, that is, the placing of the houses on the lower side of the street, is more pleasant for the occupants because the house stands freer, the view from the front windows is of the street while the valley is seen from the back. If the houses are built detached the view from the valley looking up may still be made attractive. Construction on the upper side of such streets is often made easier by an arrangement of front gardens which, if they are built up like terraces above the street level, form a larger building plot (for instance in the Nerotal in Wiesbaden). The construction on hill slopes of streets both sides of which are to be built on is usually connected with difficulties; fig. 267 shows the cross section of such a street of which there are many in Stuttgart. Where the nature of the
Fig. 259
Promenade des Anglais in Nice

Fig. 239.

Promenade des Anglais zu Nizza.

Fig. 260
Boulevard du Jardin botanique in Brussels

Fig. 240.

Boulevard du Jardin botanique zu Brüssel.

Fig. 261
Boulevard St. Charles in Amiens

Fig. 241.

Fig. 262
Promenade in Baden-Baden
ground is like that shown in fig. 268, in Tübingen, where the side of the street next the mountain is formed by a high wall\textsuperscript{13}, construction is possible only on one side.

Double streets are used on hill slopes so that both sides can be built on (fig. 269) and also in the reconstruction of existing parts of the city to preserve existing street relations or conditions. In laying out new streets on land that is already partly built on it is often necessary, as a protection against high water or in order to obtain proper conditions of ascent or drainage, to place a new high street beside an already existing way, which, when the houses now standing on it are rebuilt in years to come, is to be raised to the level of the high street and add its width to that of the latter. Occasionally however such streets are seen as permanent arrangements in the centre of the city or beside the approaches to railway stations and bridges. Examples are: fig. 270, the St. Margarethenstrasse in Basel; fig. 271, the Boulevard Helvétique in Geneva; figs. 272 and 273, the Boulevard Jeanne d’Arc in Rouen; fig. 274, the Hirschengraben and Seilergraben in Zürich. The differences in level are overcome either by walls or slopes. For foot-passengers the former are generally provided with steps, the latter with steps and ascending paths. Geneva is rich in double streets; the Rue des Casemates and the Treille are among them. The Boulevard Helvétique, illustrated in fig. 271, has foot-walls on both sides of it in places and slopes with ascending paths in others. A peculiar treatment of streets on different levels is seen in Smithfield Square in London, where the

\textsuperscript{13} See: Deutsche Bauzeitung. 1887, p. 544.
Fig. 264
Stradore delle Cascine in Florence

Ringstraße) zu Mailand.

Fig. 265
Street towards the valley with development on the mountainside

Fig. 266
Street on the mountainside with development towards the valley
approach to an underground freight station descends in spiral form between walls (fig. 275).

To make a hill or mountain side accessible for ordinary city construction two kinds of street designs are mainly used. Either a more or less straight-lined network of streets is laid out, the lines of which are approximately parallel to the contour-lines, hence nearly horizontal, while other streets ascend the slope obliquely (fig. 276; Stuttgart); or the whole network is composed of curved lines in such a way that the main streets ascend gradually while in the cross streets a somewhat steeper ascent is admissible (Ulm fig 277). The first method is more suitable for close, the second for detached construction. In addition ascending foot-paths and steps are often found which may be used as short cuts (compare figs. 98 & 276). Not only in mountain villages but also in towns, especially in
health resorts, a favorite arrangement is to build single or even whole groups of rows of extra houses higher up than the street, which are reached by steps, paths or short streets. This may be regarded as an admissible expedient but not as an organic part of ordinary city-building.

Even the carriage ways that lead up to the side of a mountain or hill often take on the character of streets with steps. Sometimes the steps with landings occupy the whole width of the street, sometimes the carriage way ascends steeply and is bordered on either side by steps with long landings, for foot passengers. The Lorenz Strasse in Stuttgart (fig. 278) is an example of the last named treatment. Defective street formations are seen on the Côte d’Ingouville in Hâvre, the landscape of which is so beautiful. An example is shown in fig. 279 where a footway with steps leads out of the highway where the latter turns at an angle of 90 degrees. A long street with steps, the houses on which are entered from the
landings, is the Ruprecht-Stiege in Vienna (compare examples in Marseilles, figs. 295 & 296).

Streets with steps and ascents are also not rare in the central districts of cities. Rome, Genoa, Geneva, Lüttich, Elberfeld and nearly all hilly cities have many such ways, which are if possible to be avoided in planning city expansions or at least limited to footpaths that serve as short cuts. Nevertheless they are often very imposing. One of the finest examples is the flight of steps leading from the Piazza di Spagna to the open space in front of the church Trinità de' Monti in Rome (compare fig. 509). More modest examples are illustrated in fig. 280, Scala della Zucca in Genoa; fig. 281, steps between the Kaiserstrasse and the Adlerstrasse in Nürnberg; fig. 282, steps leading to the Strandstrasse on the height in Blankenberghe. Also the public squares del Popolo and del Campidoglio in Rome (figs. 367 & 437), Colombo and Corvetto in Genoa (fig. 470 and 374), which will be described in chapter 6 of this part, showing combinations of ascents and steps. Ascents are always to be preferred for traffic; they may be so slightly inclined that it is possible to drive up them, or they may be divided by steps at intervals thus forming an intermediate thing between an inclined driveway and a flight of steps, like the ascent to the Roman Capitol.
Fig. 252.

*Boulevard Jeanne d'Arc zu Rouen.* (Querschnitt zu Fig. 251.)

**Fig. 273**
Boulevard Jeanne d'Arc in Rouen (cross-section of Figure 251)

Fig. 253.

**Fig. 274**
Two-lane street in Zurich

Fig. 254.

**Fig. 275**
*Smithfield Square* in London
Fig. 283 shows two ascents that cross each other, leading up to the Appellhofsplatz in Cologne; unfortunately they are laid out on somewhat too small a scale.

The approaches to bridges must be considered as a special kind of streets. They begin either in the centre of the city and lead directly to the stream, or they are laid out parallel to the banks as side approaches. In the former case the street along the bank has usually to be bridged over (London, Cologne, Coblenz); an old street that leads straight down to the river often ends at the foot of the approach (Cologne) and other streets lying parallel to the bank are connected with the approach to the bridge by steps (Würzburg, fig. 284). Examples of the second sort are, Mainz and Rotterdam (fig. 285); unless there is space enough to set the side ascents some distance back from the river bank, as in Mainz, they interfere with the traffic along the bank and are usually an inadequate connection between the bridge and the city streets.

The treatment of the highway on the bridge itself belongs to bridge construction. It is only necessary here to mention the fact that in some cities bridges also serve as approaches to islands in the river and are thus still more intimately related to the city plan, as, for instance, in Zürich and Geneva (fig. 286) where a bridge with
three arms connects a formerly fortified island with the city, and in Paris and Rome where
the bridge also "picks up" the street system of the river islands.

Sidewalks that are either considerably higher or lower than the roadway are seldom
found in new city plans but are often used in old cities as make-shifts, if railway structures,
bridge approaches, or other subsequent changes in the city, necessitate the raising or sinking
of the street. If a street is sunk one or more meters in order to carry it under a railway track,
it is often necessary to leave the sidewalks on their original level so that the houses remain
accessible, and to avoid extorionate claims for indemnification. At one of both ends the
sidewalk must then be connected with the new street level by steps or a steep incline.
Sometimes only short portions of the original sidewalk are left standing which suffice
to make the houses accessible by means of steps or steep slopes. In such cases it is even
more desirable than when the whole sidewalk is raised to provide another sidewalk, narrow
though it may be, on the level of the roadway (fig. 287).

The reverse is the case when a street is raised to carry it over something, or where
a bridge or the cutting through of a street requires its elevation; then sidewalks sometimes
remain on the lower level in front of the houses. Also where the whole length of a street
or a portion of the city is raised (above high water) such cases are frequent, for instance, in
Mainz, Hamburg, Paris and Brussels. A number of streets in Paris have steps along their
whole length or in places leading from the roadway up or down to the sidewalk level (fig.
289).

Such streets can be regarded as permanent only in exceptional cases, for instance,
the Boulevard St. Martin in Paris (fig. 288). As a rule new structures are required to be built
on the new street level so that the irregularities gradually disappear.
The introduction of two-story streets in the future has often been discussed; as yet however no street fully answering this description has been built. The Royal Traffic Commission in London has proposed plans for the future “main avenues” in that city, according to which streets of from 40 to 50m in width are to be laid out in two stories one above the other. The upper level is divided into two sidewalks in front of the houses, two roadways (with street railway tracks) and an automobile road in the middle. The lower level contains footways in front of the house cellars, two roadways for drays and other heavy vehicles, and storehouses in the middle (under the automobile road). A suspension railway above the automobile road would represent a third story for traffic.
Fig. 281  Street with stairs in Nürnberg

Fig. 282  Street with stairs in Blankenberge

Fig. 283  Landscaped ramps at Appelhofs Plaza in Cologne
In a measure the street traffic on Mansion House Square in London (marginal heading 177) moves on two stories. The foot passengers can cross from sidewalk to sidewalk by means of tunnels which at the same time form the entrances to a station of the underground railway. Curiously enough, also in the old English town of Chester covered walks have been in existence since the Middle Ages which extend along the ground stories and the first upper stories of the houses in the main street.
PART II

CHAPTER 5:
Street Intersections,
Expansions and Connections

a) Street Intersections

The right-angle crossing is the most convenient for construction. Cut off (beveled, “notched”) corners, as has already been explained under marginal heading 95, are advantageous under certain conditions in order to gain an entrance at the corner. But only if there is a great deal of traffic turning the corner is it justifiable to require beveling; as a rule it detracts from the effect of the buildings and its frequent or general use produces ugly street views. In figs. 290 & 291 beveling would be useless. Fig. 290 illustrates in addition how a side street on which there is much traffic can be brought into a wide main street in a practical way, by forking.

At the same time oblique crossings are to be avoided in a naturally developed city plan, particularly on uneven ground. In this way acute block angles are formed which require to be cut off on account of the traffic as well as for conveniences in building (fig. 292); and obtuse block angles which do not require beveling and are often very ugly when so treated. In some cities, for instance in London and Brussels, corners are generally rounded, instead of cut, off, a practice that is perfectly feasible where the angles are obtuse or acute.

Fig. 287
Lowering of Eigeltstein Street in Cologne
Sometimes, particularly where new streets are laid out in districts already built up, intersections of streets on different levels occur. Figs. 293 shows the bridging over of such a street in Paris; steps lead down from the sidewalks of the Rue Bauduin to those of the Rue Bellefond, while it was found impracticable to connect the roadways of the two streets. The corner houses on the lower street are one or even two stories higher than those on the upper level. In the construction of the Holborn Viaduct in London (fig. 294) stately stairways leading from the upper to the lower street have been placed in the four corner houses. In fig. 271 the bridging over of the Boulevard Helvétique in Geneva, by two radial streets, has already been shown.

An interesting treatment is seen in Marseilles where the Rue de Grignan and the Rue d’Aubagne are carried across the Cours Liautand (figs. 295 & 296). While the Rue d’Aubagne, with an ascending roadway on iron arches, crosses the Cours Liautand, which is cut through the old city, at about 30 degrees, for the Rue de Grignan only a footway leading down to the Cours has been constructed, which is continued on the other side as a street with steps, ornamented with sloping flower beds, while the houses are entered from the landings. All these streets are connected by a winding stairway.

Under marginal heading 141 it has already been mentioned that, particularly where there is a slope, the flush-lines may be set back in order to shorten the line of vision in a street. (fig. 118, 121) It is clear that such offsetting in main thoroughfares cannot be disadvantageous to the traffic. The offset flush-lines in figs. 118 and 121, as well as those in figs. 297 to 300 are admissible and enrich the street view. An offset street as illustrated in fig. 301, on the contrary, would be inadmissible if A B were a traffic direction, for it is obvious not only that the space x y would be congested by absorbing both the traffic directions A B & C D, but also that it is not easily surveyed and is therefore likely to be a source of danger and collisions. The fact that the traffic cannot be surveyed in the direction in which it moves is a greater hindrance than its congestion at
this point. Moreover we need only imagine the line A B to represent double streams of traffic to recognize the difficulty they would experience in winding their way around the sharp curves of the space between the point where the road terminates on entering the main thoroughfare and where it branches off on the other side. Even if this space were widened, as indicated by the dotted lines, the difficulty would not be overcome.

We have entered more fully into this question of offsetting the directions of traffic, because others have falsely concluded that by such an arrangement they might relieve traffic. Fig. 302 shows that where one street simple branches off from another there are three intersection-points of the lines of travel; a simple cross-roads, on the other hand, has sixteen such points as shown in fig. 282. This misled people into thinking that, if in place of the cross-roads two branch streets were brought into the third from opposite directions, that is if the traffic direction were offset according to fig. 301, the difficulties at this point, which consist mainly in these intersection-points of the lines of travel, would be relieved\(^{14}\). The false conclusion was based on the fallacy that the points of collision at a crossing would thus be reduced from 16 to \(2 \times 3 = 6\). But this is not the case.

If all the lines of travel at a cross-roads (fig. 303) be drawn in on an offset crossing (fig. 304) it will appear that the number of intersection points is not reduced but increased from 16 to 18, because we have the unnecessary addition of the two intersection points of the lines of travel C – B and D – A which now form one course. Hence the offsetting of traffic directions not only adds to the congestion of the traffic and makes it more difficult to overlook, but it also increases the danger points; yet the greatest of those disadvantages is that

---

14 See: Sitte, C. Der Städtebau nach seinen künstlerischen Grundsätzen etc. Vienna 1889. P. 100 and 101.
it cannot be easily surveyed, for this renders every driver uncertain and increases the danger of collisions.

At irregular crossings suitable treatment of the block corners often results in deviations in the flush-lines as was shown in figs. 298 to 300 and as is further illustrated in figs. 305 and 307. As in this case the traffic directions are not affected, there is not only no cause for hesitation but, on the contrary, the possibility of producing a picturesque street effect, which is very desirable.

Figures 306 and 308 cannot be called crossings; they are rather branches or forks. The widened spaces that result give the street area and the building blocks a suitable form. Fig 306, at the same time, closes the lines of vision of the three streets that converge at this point.
Figs. 309 and 310 are regular, figs. 311 and 312 irregular five-way junctions. Such irregular treatment often produce spaces like public squares and picturesque grouping may often be formed thus, particularly if the streets converge without intersecting one another.

Junctions of more than five ways generally produce difficulties in building and the regulation of traffic. As a rule it is better to avoid such arrangements as are illustrated in figs. 313 to 316

One of the busiest street junctions in the world is Mansion House Place in London (fig. 316) where seven thoroughfares converge. Owing to the closely built-up condition of the London city district it was not possible at this point to
provide a larger space for the better accommodation of traffic; four isles of safety and several policemen have to suffice for the regulation of the enormous traffic. It often requires great skill to cross safely from one pavement to the other. At such points the expediency of connecting the sidewalks with one another by bridges or tunnels immediately suggests itself; in this instance the idea has been carried out by footways underneath the street that are also the entrances to a station of the electric underground railway. How pleasant, contrasted with this square, is the oval junction ornamented with a garden area in Verviers (fig. 314).

Although as a rule larger open spaces are quite unnecessary at a four-way intersection, square, octagonal or round open spaces are often found at such points (figs. 317 to 324).

A great disadvantage of diagonally placed squares at street intersections (fig. 317) is that, although they make it easier for vehicles to turn into the other street, they oblige foot-passengers who are going straight on to cross three roads instead of one. If there are no isles of safety at the points indicated the pedestrian crosses the whole length of the diagonal without protection among the vehicles, unless he takes a circuitous route. Squares of this shape, which are unfortunately so frequent in our city extensions, have not even picturesqueness or sanitary
advantages to recommend them; hence, if the traffic really requires an enlarged space at such a point, simple beveling of the corners is as a rule to be preferred.

In figs. 318 and 319 the “frame” of the square is indeed somewhat more pronounced; but they possess the same difficulties as regards foot travel. Fig. 318 has the added disadvantage of a hindrance to carriage traffic in the shape of a monument in the centre.

In the same way octagonal and circular spaces (figs. 320 to 322) are usually not practical and do not meet the demands of beauty unless they are surrounded by uniformly monumental buildings. The unused spaces that are formed behind the line of the
sidewalks are generally unclean and useless. In London circular spaces at street intersections, called circuses, are very frequent. The edges of the sidewalks, in contrast to those in figs. 321 and 322, run parallel to the line of the houses; hence the spaces lying between the regular lines of travel and the footways are parts of the roadway and generally serve as cabstands (figs. 323 and 324). The space thus gained for this purpose may justify the laying out of such circuses in the London city district where the whole street surface is usually covered with traffic and stoppages at the crossings often occur; the pedestrian however can scarcely be said to profit by them.

If the spaces are of considerable size these disadvantages partly disappear as the square can be differently treated and ornamented (figs. 325 to 327). But even if such spaces are made attractive by garden areas and artistic decoration, their shady sides are yet obvious. In figs. 325 and 326 the garden areas are unpleasantly cut up by the main streets; the side streets in fig. 326 are almost unused. In fig. 327 the vehicles travelling in the cross direction are obliged to drive round a half circle.
It is interesting to note that the garden area in the centre is laid out on a horizontal plane although the Rue des Héros ascends sharply; an arrangement that necessitates the use of steps for foot passengers who cross the space in the direction of that street. In all the cases illustrated here the decoration would be more effective and the space less cut up if another site had been chosen for the square. It may be accepted as a general rule that four-way intersection is a suitable place for a square only under special local condition.

**b) Street Expansions.**

At points where streets intersect or branch off as well as in closed street sections expansions are often introduced for the sake of variety or in order to make certain points prominent. They are usually simple in character, as shown in figs. 328 to 333.

Designs like those shown in figs. 329 and 330 sometimes serve to conceal a slope (marginal heading 141).

An attractive design is shown in fig. 331. The houses grouped about the little garden area enjoy, to a certain extent, the double advantage of a situation on a traffic highway and seclusion from the dust and noise of the street; the beveled corners prevent the accumulation of dirt that is otherwise likely to occur at such points. Excellent designs of this sort are found in London (figs. 332 & 333 where a side street serves as the approach to the houses lying behind the front garden plots, so that the occupants enjoy the advantage of living on a main thoroughfare without being inconvenienced by its noise.

A large number of city squares are nothing more than street expansions. As examples may be mentioned the Place des Minières in Verviers (figs. 334), the Place de la Posta in Geneva (fig. 335), the Piazza San Carlo in Turin, with a monument, (fig. 336), the Place Masséna in Nice, surrounded by arcades (fig. 337). The Salvator Platz in Breslau (fig. 339), the Zentralbahnplatz in Basel (fig. 340) and even the beautiful Promenadenplatz in Munich (fig. 338) may also be included in this group. This is the case to an even greater extent in the Opernplatz in Berlin and the Schwarzenberg-Platz in Vienna, both of which are in reality parts of the street surface.
Fig. 308
irregular street deviation

Fig. 309, 310
regular intersection with 5 arms

Unregelmässige Straßenabzweigung.

Fig. 308
irregular street deviation

Fig. 311, 312
irregular street intersection with 5 arms
Finally, those street expansions that are designed to unite different street directions are of much importance in the city plan. Such spaces have already been illustrated in figs. 309 and 310. Other examples with horticultural decoration are shown in fig. 341, the alteration in the course of a main street, and fig. 342, the connecting point from which two diagonal streets branch off.

This brings us to

**c) Street Connections**

By street connections we mean the connection or adjustment of different street widths, street profiles or street directions. Figs. 343 and 344 show narrow street profiles led into wide ones, fig. 346 the alteration in the profile of the Chaussée de Malines in Antwerp, fig. 347 that of the Elisabethen-Strasse in Wiesbaden, fig. 345 that of the Kaiser Wilhelm Strasse in Breslau; in the latter the building line is straight while the roadway is curved which results in considerable variation in the depth of the garden plots and variety in the profile. Variety in street cross sections was discussed in connection with the Andrassy-Strasse in Budapest. It is important in connecting these profiles that the main axis or certain main lines should be continued beyond the point where the change is introduced and that parts of the second profile (edges of the footways, rows of trees etc.) should not protrude into the line of travel or the lines of vision. Setting forward the building line, on the contrary, adds to the attractiveness of the street scene.

The points at which streets from different directions converge irregularly
and are connected, often form open spaces, as in figs. 348 to 353.

In fig. 351 it would have been easy to have connected the Rue Bleue with the Rue Cadet by straight lines but a very wide sidewalk was preferred as it was convenient for pedestrians and provided space for the erection of two booths and a lavatory.

Many so-called “squares” are in reality nothing more than expansions of the street surface used to connect the various street directions that converge at this point. They are often skillfully laid out, sometimes contain garden areas and statuary but in some instances are awkward and unserviceable.

The decoration of the Holbein-Platz in Basel (fig. 354) is attractive
and worthy of imitation. It consists of a single tree within an enclosure in the centre and small planted areas along the curved portions of the sidewalks. The Kranzplatz in Wiesbaden (fig. 355) which was originally nothing but the junction of several streets, has become, owing to its horticultural and artistic decoration, one of the most beautiful spots in the city. A Belgian arrangement of the same sort but one that is not so well adapted to the traffic directions is seen in fig. 356, the Place Delcour in Lüttich.

A special sort of street connection is that, frequently recommended by Sitte, which is like a turbine or windmill in form (fig. 357). Where the traffic is light and the local conditions favorable, that is in regard to property boundaries, this kind of square is to be thoroughly recommended because the view from each street is of the closed side of the square.

Practical and worthy of imitation as these street connections are, others are in the same degree ugly and unserviceable, for instance figs. 358 and 359.

The Königsplatz in Breslau is only recognizable as a unified design on paper; on the spot itself it is impossible to see the separate portions as parts of a whole. The Oranien-Platz in Berlin is still more unpleasantly divided by the Landwehrkanal: the whole surface is so cut up that the designer’s intention of forming a square is hardly to be recognized, just as it is difficult to see that the Dresdener Strasse is continued on the other side of the canal.
Fig. 321
Intersection plaza with four quarter circles at the corners

Fig. 322
Circular intersection plaza

Fig. 323
Oxford Circus in London

Fig. 324
Ludgate Circus in London

Fig. 325
Pelikanplatz in Zurich

Fig. 326
Taufenzienplatz in Breslau
With skillful treatment street expansions and connections may be combined so as to form charming designs, which are the more attractive the more the peculiar character of the locality is considered. An example is given from the suburbs of Posen (fig. 360).
PART II

CHAPTER 6:
Open Spaces According To
Their Importance In The City-Plan

The ornamental streets, described in the foregoing chapter, whose purpose is not so much to leave larger spaces open for traffic as to render the aspect of the streets and the properties along them pleasing to the eye, form the connecting link between streets and street crossings, and open spaces. The latter have various purposes: to absorb the traffic coming from different directions and distribute it in others, to offer available space for market-places and other public utilities, to provide ornamental spots, generally garden-like in character, and finally to create appropriate places for the erection of public buildings and monuments. Thus open spaces are classified
Fig. 301.

Seitliche Straßenerweiterung mit Gartenanlage.

Fig. 331
Side street extension with landscaping

Fig. 302.

Nottingham Terrace zu London.

Fig. 332
Nottingham Terrace in London

Fig. 303.

Lorain-Place zu London.

Fig. 333
Lorain Place in London

Fig. 304.

Straßenerweiterung mit Gartenanlage zu Verviers.

Fig. 334
Street extension with landscaping in Verviers
Fig. 335
*Place de la Poste zu Genf.*

*Place de la Poste in Geneva*

Fig. 336
*Piazza San Carlo zu Turin.*

*Piazza San Carlo in Turin*

Fig. 337
*Place Masséna zu Nizza.*

*Place Masséna in Nice*

Fig. 338
*Promenaden-Platz zu München.*

*Promenaden Plaza in Munich*

Fig. 339
*Salvator-Platz zu Breslau.*

*Salvatorplatz in Breslau*
as traffic centres, useful areas (market-places, people’s gathering places), garden areas (ornamental areas, squares) and architectural areas (monumental areas).

It is by no means unheard of for one space to serve two or more of these various purposes, or for two spaces differing in purpose to be connected. Examples of the first sort are the great radial areas in Paris (figs. 370 to 372) which absorb and redistribute traffic and yet are ornamented in the centre or along the edge with flower beds, fountains and so on; also playgrounds surrounded by trees and foliage and those useful or ornamental spaces which at the same time form the foregrounds of public buildings. Two spaces of different character, connected so as to form one design, may be called a “double square” and the union of several such spaces forms a “group of squares.”
Fig. 342
Street extension with beautification and landscaping

Fig. 343
Street medians in Wiesbaden

Fig. 344
Street medians in Brussels

Fig. 345
Kaiser-Wilhelms Street in Breslau

Fig. 346
Mechelner Landstrasse in Antwerpen
A) Traffic Centres.

When the intersections and connections of streets discussed in the preceding chapter are extended beyond what is required by the shape of the building sites and the street areas so as to provide greater space for traffic, real traffic centres are formed which, in accordance with the purpose for which they were created are entirely given up to the passage of vehicles, street railways, etc. Figs. 361 to 375 are examples of these, but the French radial spaces are scarcely to be recommended. If the diameter of the space is small the circular form of its circumferential line is inconvenient for building. The streams of traffic, all directed towards one point, interfere with one another. For pedestrians, who must either cross the centre unprotected among the moving vehicles, or take a circuitous route along the sidewalks, such spaces are altogether undesirable. This disadvantage is somewhat decreased by placing “islands” with or without lampposts within the open space as an aid to pedestrians (fig. 365).

Such a division of the open space becomes the more necessary the more extensive the area is. On the one side such a division tends to distract from the impression of the space as a whole, on the other it contributes to the beauty of the details, as the islands may be ornamented either with vegetation or by fountains, statues etc. The railway station squares in Strassburg and Hannover (figs. 366 and 368) for instance contain flower beds and trees. The Place d’Eylau in Paris,(fig.371) the Piazza del Popolo in Rome(367) and many other are adorned with fountains, and both vegetation and fountains are liberally used to decore the Place des Nations and Place d’Italie in Paris (figs. 370 and 372). We find monuments on a centre island in the Corvetto Square in Genoa (fig. 374) and in the above mentioned station squares in Hannover (fig. 366). City gates or triumphal arches adorn the Place de l’Etoile in Paris (fig. 369) and the squares alla Croce and San Gallo in Florence (figs. 373 and 375). The Piazza del Popolo in Rome in particular shows the imposing appearance of spaces formed by the confluence of various directions of traffic although being open in their nature they cannot possess the artistic charm of other, enclosed squares.

Though a circular or polygonal form is seldom advisable for a traffic
centre and the dislike of a so-called radial space therefore well-founded, the form of a semicircle or square appears to be thoroughly practical in the many cases in which traffic coming from one direction is to be distributed like the spokes of a fan in different directions, especially at city entrances, bridge-heads and in front of railway stations. The above-mentioned Pizza del Popolo in Rome (fig. 367) possesses a peculiar form of great charm.

Coming through the city gate one enters an elliptical space from the side. In the centre stands an obelisk with four drinking fountains and at the ends there are also fountains behind which
arched entrances to driveways ornamented with plastic work surround the space. The east driveways wind up to the Monte Pincio. Along the minor axis of the ellipse, on the side towards the city, lies a distribution space from which radiate the Via di Ripetta, the Via del Corso and the Via del Babuino. The two domed churches between these three rays of traffic and the two buildings at the side of the city entrance enhance the truly majestic character of this magnificent place.
Fig. 355
Kranzplatz in Wiesbaden

Fig. 356
Place Delcour in Lüttich

Fig. 357
Turbine- oder Windmühlenplatz.

Fig. 358
Plazas as medians: Königplatz in Breslau
An irregular, medieval traffic center, The Hopfenmarkt in Wismar is illustrated in fig. 376.

Modern traffic entres of irregular form are shown in figs. 377 to 380, taken from the suburbs of Posen, Cleve, Brünn, and Munich. It is noticeable in these examples that the view from nearly all the streets running into the space is of the opposite wall so that although in reality open the impression received is that of an enclosed space and further that the different directions of the streets do not intersect one another at any point.

“Street islands”, called réfuges in France and resting places in England, are of great importance for the passage of pedestrians. They are also frequently found on broad street crossings, widened parts of streets and spaces connecting streets. They are most used in the great cities, Paris, Berlin, London where the neutral space between the main lines of traffic is generally raised a step, often enough without any consideration being given to the pleasing form of these islands. Their shape, their symmetrical position and their distribution could, and should, be much improved. The curbstones of these islands are usually laid so that they are on a line with those of the sidewalks thus enabling the pedestrian to continue on his way as directly and comfortably as possible. Where the islands are large enough, they are used for lampposts, columns for placards, even public toilets, sale booths and street car waiting rooms. Trees, flower beds, and fountains are permissible only when the islands are large enough to accommodate them without affecting the foot travel.

Carefully placed islands are also more an advantage than a hindrance to street traffic because they oblige vehicles to keep to the regular lines of progression and thus prevent confusion.
Monuments, ornamental arches and other larger structures are seldom erected on traffic centres; a few examples have been cited above.

One charm of the Parisian radial spaces is that, standing in the middle of the space, one can enjoy one after another the perspective views of several streets diverging more or less like rays so that a series of metropolitan street scenes is unrolled before the spectator like a panorama. No visitor to Paris can ever forget the cycloramic views from the Place de L'Etoile, the Place d'Italie, the Rond Point and other points; the splendid perspective of the streets, generally beautified by rows of trees, emphasized by artistic terminations, is well calculated to bring to the minds of many the pettiness of home conditions. Yet there is much striving after effect in these areas which appeal less to German feeling than do the irregular forms in figs. 376 to 380.

Without the metropolitan life and varied architecture that occupy and surround them there is a suggestion of the gaming dial about these radial spaces that makes them confusing. Other centres of traffic too, are, as a rule, uncomfortable spots in the city. They are a necessary evil whose shady sides are more than balanced by their brilliant points only in rare cases (Rome, Florence, Paris) In general and especially in making plans for the expansion of medium-sized and small towns it is well to limit the establishment of real traffic centres to what is absolutely necessary and to avoid entirely open spaces designed for traffic. Ordinary street crossings and carefully planned connections between streets will in many cases fulfill the same purpose without the same disadvantages.

b) Useful Areas.

The name indicates that we have to do with open spaces that are not devoted to general street traffic but are intended to be used for business purposes, trading, shows, people's gatherings and so on. In this sense we speak of market-places, fair grounds, exchange squares, exhibition grounds, commons, etc. They form, in so far as general city carriage traffic, at times even ordinary foot travel, is excluded from them, the exact opposite of the traffic centres just discussed.

In provincial towns, particularly in old places, the “market” is generally the open space in the centre of the town where the town hall, the stock exchange, the police station, occasionally also guild halls, stand, and in the neighborhood of which rises the principal church. Here buying and selling went, and go on, on certain days or, when convenient, at the time the above-mentioned public buildings were visited; here shows, public merry making and military reviews took, and take place. In Silesian and Bohemian towns it is the “Ring”, in Belgian and French towns the Place d’armes, in smaller Italian towns the Piazza or Signoria that unites all these purposes in itself.

A connecting link between open market-places and enclosed, covered market-halls is formed by the custom that prevails largely in Belgium, France, Italy, Austria and some Southern German towns of building on the marketplace
or round about it open halls in which either booths are rented separately or the whole serves as a shelter for the market people in bad weather.

At the present day the effort is made everywhere, particularly in larger cities, to provide enclosed and covered halls which take the place of open market-places. Nevertheless the need of such open places for the sale of vegetables, fruit, flowers and for fairs and shows will always be felt both in the out-lying districts of large cities and in medium-sized and small towns. In making city-plans and plans for city expansion provision should therefore always be made for suitable market-places (useful areas) at the risk – if it can be called risk in this connection – of these areas being diverted in the future from their original purpose and becoming, for instance, planted areas, playgrounds or sites for public buildings. About one square meter of useful space for every ten inhabitants is the least that will meet the need.

A market-place should be as near as possible to the traffic centre of the particular district of the city in which it lies or, in the case of smaller places, of the town itself; the main stream of traffic must pass along at least one side and wherever possible this should be the traffic of a street coming from a city entrance or of some other that leads conveniently to the suburbs; wagons and street railways should under no circumstances cross the place at any point. It is seldom easy in making the plan of a city to fulfill these three conditions and for this reason it is so difficult in a city that has outgrown its old market-place to make a new one out of one of the other open spaces.

Market-places are better adapted than traffic centres to be planted with trees and ornamented with fountains and statuary. Rows of trees are advantageous to the arrangement of the booths and pleasant for passerby; drinking fountains for men and animals are very desirable.

For markets that are entirely or partly covered the same fundamental principles should be observed as for open-market-places. In addition they should be regular in shape and as far as possible should possess good connections with the railways, especially the suburban railways; finally, when more pretentious, they require cellars and cold storage rooms.

Market-places are also suitable, if adapted in size and position, for the other uses mentioned above, such as a shows and fairs, peoples fêtes etc. The dimensions should be equal to these demands, as a rule considerable measurements are necessary.

But above all in large cities the artistic arrangement and adornment of fair grounds and commons should receive much more attention than has hitherto been given them. In this respect the Greeks and Romans might again become our models. Open halls or terraces might surround the open space; in order to afford a better view of it the latter would have to be sunk several steps below the level of the surrounding streets. It cannot be doubted that the folk-dances on the
Fig. 361
Straßburgerplatz in Lille

Fig. 362
Ferdinandplatz in Dresden

Fig. 363
Golden Sporen-Plaats zu Kortryk

Fig. 364
Victor-Emanuel-Platz in Turin
Piazza Navona in Rome and the carnival festivities on the Neumarkt in Cologne would offer a doubly charming picture if the scene of the fête could be overlooked from streets and terraces about it, whereas today only the upper stories of the surrounding houses offer full enjoyment of the spectacle. Arches, columns, obelisks, fountains may serve to decorate the area which would then also come under the head of architectural areas, to be discussed later.¹⁵

Figs. 381 and 382 represent the Altenmarkt in Cologne and the Marktplatz in Düsseldorf(fig. 383); the market-place in Brussels which at the same time by virtue of the buildings that surround it and its fine proportions is one of the most beautiful architectural areas that exist. Figs. 384 & 385 show the normal plan on which the market-places of almost all the medieval colonial towns in the German East were laid out (for instance, Glogau, Posen, Pilsen, Neustadt in Upper Silesia, Waldenburg, Dirschau). The streets become narrower where they run into the place, at the corners, and the sides are sometimes bordered

¹⁵ compare: Heuser,G. Public squares and their arrangement for festive purposes etc. Deutsche Bauzeitung 1889.p.508
Fig. 367

Piazza del popolo in Rome

Fig. 368

Bahnhofplatz in Straßburg
by arcades. The areas themselves are partly covered with buildings.

The Paris market-halls, illustrated in figures 386 & 387, are built to a certain extent in the inside of a complex of houses, though the halls are surrounded on all sides by streets. Fig. 388 shows the central market-hall in Cologne, built on a site formerly occupied by an old quarter of the town, with its railway connection on the east side.

Excellent in effect is the old, long and narrow Piazza Navona in Rome ornamented with three magnificent fountains (fig. 389). As a market-place it is thoroughly practical, and, when illuminated, as the scene of folk-dances on Italian evenings, it is charmingly beautiful.

It was also intended in planning the expansion of Cologne to make the Königsplatz (fig. 390) a suitable and appropriate place for festivals but this unfortunately was not carried out. In size (27,000 sq. m), situation and form it would have been admirably adapted to public festivals, military tournaments and especially to the organization of the annual Shrove Tuesday procession.

A special sort of useful areas that we have not yet mentioned are cab-stands. In the absence of proper spaces designed for this purpose, cabs are allowed to stand along the edges of markets, in the spaces in front of public buildings, in unusually wide parts of the streets or at the beginnings of side streets close to the principle arteries of traffic. In London the stands are usually in the corners of the circuses and along the middle of broad road-ways such as Farringdon Street (Fig. 391) and Haymarket Street. Fig. 392 represent two cab-stands that are particularly suited to this purpose. The vehicles stand so that they do not interfere
with the traffic and the “islands” or resting-places afford convenient spots from which to treat with the drivers and enter the cabs.
Fig. 375
Cavourplatz in Florence

Fig. 376
Hopfenmarkt zu Wismar
(Urregelmäßiger Verkehrsort.)

Fig. 377
traffic place of the city expansion of Posen
c. Garden Areas.

Garden areas, also called squares, are of service in the first place to public health and recreation but at the same time they are the most pleasing means of adorning our cities. They offer opportunity for rest on shady seats and in attractive surroundings; their fresh foliage, flowers and green grass are a delight to the eye. For the inhabitants of the city in conjunction with the promenades and parks they supply the place of the natural beauties of the country. They are a check on roughness and with careful cultivation exert an educational influence on young people; they refresh body and mind. It is a well-known fact that the narrower and dingier the quarter of the city, the denser and more unattractive the dwellings, the more remote from bright sunshine and the freshness of nature, - the rougher and coarser are the people, the wilder the boys and girls, the more neglected the children. Just as important as the demands of traffic, building and beauty are the fundamental principles of public physical and moral health. This consideration makes it the duty of whoever plans a city to see to it that the city of the future be provided with green resting places and playgrounds sufficient in size and number, conveniently situated and carefully arranged. Especially is this his duty to the middle and lower classes of the population who generally live in cramped dwellings without gardens or other green about them.

The fatherland of squares is England. Especially in London and Edinburgh they are found in rich variety and agreeable grouping. The great West End district of London, from Holborn Viaduct to Regent's Park is an excellent example; a characteristic group of this district is that sketched in fig. 393 showing Russel, Torrington, Woburn, Gordon, Tavistock, and Euston Squares. Not less charmingly provided with garden areas is the new (and very artificial) district of Edinburgh extending from Princess Street to the St. Stephen's Church of which some idea is given in the sketch of the city plan in fig. 397. The love of nature and the nearness to it, so generally regarded as necessary, and the suggestions of the country so carefully placed among the dense blocks of masonry in the cities are a most delightful phase of English life. The garden areas seem to a certain extent to be the point of departure for the plotting out of building estates to which the conditions of property holding in England are most favorable. Large connecting pieces of ground belong to some private individual who cuts them up into building lots and leases them for 99 years.

The square in England is moreover usually an intermediate thing between the public square and the private garden. It is indeed surrounded by streets but is generally not open to the public. As a rule it is fenced in and cannot be used except by those families - usually those living about it - who have keys to the gate. It ceases entirely to be public of the common garden if the common garden is enclosed by the backs of the houses, that is, if it lies in the inside of a building complex, which arrangement is also sometimes found in England. Figs. 394 & 396 show two favorite arrangements in the network of streets; the oval, or otherwise
rounded-off, shape of the garden area is very popular. The inner divisions of these squares are not given in our illustrations because of their small scale; playgrounds, arbors, fountains, bowers for birds and so on are used for recreation and ornament.

Garden areas were not introduced into France and Belgium until later; the French are more inclined to outward display and show than to natural ease. In France the enclosed square serves either merely to beautify the street, without being entered at all, or it is open to the general public. An example of the latter sort is shown in fig. 398.

The Piazza Carlo Felice in Turin (fig. 395) is also a pretty square, adorned with fountains and works of art, surrounded by colonnades, a pleasant welcome to the traveller entering the city at the central station.

In Germany and Austria the place of squares was formerly generally taken by long rows of trees in the streets or by the walks which were justly so popular along what had once been fortified walls (Frankfurt a.M., Aachen, Leipzig, Braunschweig, Bremen, Breslau, Krakau, etc.) The former only too often lead a sad life amid the traffic of only moderately wide streets and are detrimental to the effect of the architecture; the latter with all their charm can do but little good to the centre of the city or the outlying districts.
Lately refreshing efforts have been made in German cities to bring green grass and foliage into all quarters of the city, entirely changing the aspect of old markets or graveled spaces, surrounding public buildings with lawns and vegetation and, where new plans are concerned, providing from the beginning for garden areas.

In this respect the capital has accomplished much. The Wilhelm-Platz (fig. 399), the Dönhoff’s-Platz (fig. 401) and the Königsplatz (fig. 405) are laid out on a really metropolitan scale. These areas are not enclosed but are divided by foot-paths running straight and diagonally across them into symmetrical hedged plots. Besides the foot-paths the Königplatz has a system of broad drive-ways which cuts up this otherwise so magnificent square more than is desirable and decidedly detracts from its effect. Monuments ornament all three
of these Berlin squares. The mighty triumphal column in the centre is the dominating feature of the Königsplatz. For some time now it has been recognized that a driveway through the Wilhem-Platz would also be most desirable. To meet this need Goecke has designed the plan in fig. 400 showing remarkable alterations. He also planned the alteration of the Dönhoff-Platz (fig. 402). Both plans provide for an inside space to surround the monuments which would thus gain in effect. A stately square is the Schlossplatz in Stuttgart (fig. 406). Adorned by a monumental column, two fountains and statuary, traversed by foot-paths and most carefully kept, it is one of the finest existing spaces before a royal palace.

As an example of a small garden area which has no thoroughfare but is closed and serves solely to beautify the city, the Friesenplatz in Cologne (fig. 403) should be mentioned. At its broad end, between the “islands” the different streams of traffic are provided for without cutting through the planted area.

An unfortunate situation is that of the Georgs-Platz in Hannover (fig. 404) which is divided diagonally by the principal driveway into two triangles one of which is still further cut up by other drives. The Albert-Platz in Dresden (fig. 407) is divided as little as possible and may therefore claim to be treated as a garden area whereas the similar areas discussed under a in this chapter bear rather the character of traffic centres.

In contrast to traffic centres and market-places garden areas should lie away from the main traffic, secluded and removed from the noise and dust of the streets; at most the stream of traffic should touch these areas only on one side (fig 409). Cutting up the area by one or more driveways is to be avoided and is permissible only if the sections still remain large enough to form independent plots.

Planted squares, as indeed all garden areas, are better situated in a valley or depression than on a height, partly because they are more protected and vegetation grows better there and partly because the view of the lawns, shrubbery and flower beds is more beautiful and enjoyable if seen slightly from above. Examples of larger areas are the Botanical Garden beside the Ring Street in Brussels, the park in Laeken, the new Volksgarten in Cologne, further the Karlsaue in Cassel, the park “Nizza” on the banks of the Main at Frankfurt, the Giardini publici in Milan
the view of which from the neighboring streets above is particularly picturesque.

The vegetation of a garden area must not resemble that of a wood, a grove or a park; but in order to suit the urban character of its surroundings and not to detract from the architecture it should in general be low and subdued, particularly where its green is intended to form the foreground of some building. Single groups of high trees are nevertheless by no means undesirable and in some places are even necessary to hide some ugly view or to frame an artistic scene and to allow of the comparison of the heights of buildings. In small spaces it is most practical to make the plots geometrical in shape taking care that the lawns are slightly sunk below the level of the paths. Enclosed areas intended to be entered are on the contrary often very successfully treated like small park landscapes in English fashion (figs 408 & 409). This subject is more fully discussed in Part VI which treats of city gardens, parks and parkways.

Public playgrounds are another kind of garden areas that still remain to be discussed. They are the real recreation grounds of the city youth and therefore of eminent value. Figs. 410 and 411 give two examples taken from the city expansion of Cologne.

The Beethoven-Platz is planted in such a way as to leave the entrances open (fig. 410); the equipment consists of benches and a table with sand. A combination of open and closed playgrounds is shown in a part of the Sachsenring (fig. 411); the upper playground is open at two entrances: the lower one, situated on a part of the old town moat and protected by a bit of the old town wall, is on the contrary only open periodically, when it is very popular.

Fig. 412 shows the combination of a playground with a garden area which is traversed by paths and furnished with seats.

Such playgrounds are not so generally found in Germany as in England where the municipal authorities and clubs actively favor their establishment in the interest of public health. As long ago as in 1889 London possessed 28, Manchester 11, Birmingham 9, Bradford 7 public playgrounds which were and are used by school children under the supervision of a teacher. But also in Germany and Austria interest in public playgrounds for athletic sports is constantly increasing.

Several playgrounds or ornamental areas of medium or small size are obviously more practical than one large one because the health-giving advantages of several areas affect a larger number of people and the distance from business houses and work-shops to a place of recreation, a green spot, is thus lessened. The man who is planning a city always bears this consideration in mind will have at his disposal a large number of opportunities to benefit the future inhabitants without losing his way among projects which cannot be carried out. But even in the central districts of old cities much may often be accomplished at small expense for the comfort and health of the population, by turning the unused ground about public buildings, disused fair grounds, former convent yards, old
cemeteries and the like into garden areas or spaces planted with trees.

d) Architectural Areas

In the beginning of this work, in part I, chapter 3, the subject is discussed how public buildings must be grouped in the city plan and particular attention is paid to their location in its relation to the neighboring streets. We are now concerned with the arrangement of the spaces themselves on or bordering on which public buildings are erected. A space on which a monumental building standing alone, or nearly so, is erected may be called a covered public space in distinction to an uncovered open space which lies in front of such a building or surrounded by several of them.

As two particular groups we should like further to mention especially city gate squares which have been laid out in numerous city expansion plans in order to save existing gates and gate towers from being torn down; and monumental areas the form and arrangement of which are dependent chiefly or partly on the erection of a statue or one or more monuments.

1) Spaces in front of buildings

The site of a public building should be such that the building may be easily viewed from nearby as a whole the details of which are sufficiently recognizable, yet, from an appropriate distance it should appear in advantageous perspective and so as to invite nearer inspection. Both these conditions however should be fulfilled without disturbing the course of traffic.

For this reason it is obviously
Fig. 389
Piazza Navonna in Rome

Fig. 390
Königsplaz in Cologne

Fig. 391
Johannisplätzchen in Cologne

Fig. 392
Karls Platz in Munich
inadmissible to place prominent edifices in between other buildings in the ordinary building line. It is a sign of an inadequate city plan if it is found necessary to resort to such an inartistic arrangement. A good expedient is to place the principal building back from the street line and to conceal the neighboring buildings by side wings extending forward to the building line, (for instance, the spaces in front of Palazzo Pitti in Florence and San Carlo in Milan fig. 413). In building gentlemen's residences this device is frequently employed in such a way, especially in France, that the space between the wings is suitably shut off from the street thus forming a cour d'honneur. Similar arrangements are shown in figs. 414&415, and in fig. 416, the space in front from which the church is viewed is cut out of the opposite side of the street.

A building however appears to much greater advantage when it stands on or behind an appropriate open space and at the same time in proper relation to the streets that run into the space. Only under such conditions can a satisfactory view of the edifice be obtained both from nearby and from a distance.

Such open spaces are only adapted to set off the front of a building to the best advantage; their size should be determined with this end in view. As a general rule the depth
of the space should be at least equal to the height of the building and is better to be one and a half times or twice as great.\textsuperscript{18}

As examples the spaces, already mentioned, in front of the railway stations in Kortryk, Hannover, and Strassburg may serve (figs. 363, 366, and 368) also the Appellhofplatz in Cologne (fig. 421) and the St. Moritz-Platz in Lille(fig.420); the two latter are decidedly too small to allow of a proper view of the massive edifices behind them. More favorable in their dimensions are the Piazza Colonna in Rome, ornamented with the column of Marcus Aurelius (fig. 418) and the Piazza Santa Croce in Florence (fig. 419). The Luisenplatz in Wiesbaden (fig. 417) would be amply large for the Hoffmann church if it were not divided by the Waterloo Obelisk and planted with shrubbery. The great square on which the Milan Cathedral stands (fig. 107) impresses one as very extensive in spite of the Victor Emanuel monument and the vegetation with which it has subsequently been decorated, and is altogether too large. The cathedral square in Palermo with its statuary and balustrades is certainly more beautiful and attractive. The square in front of Trinity Church in Paris (fig. 422) is one of the finest in existence; the driveway which surrounds the square and by which the church is approached is raised several yards above the street level; proudly the edifice rises forming at the same time the head of the Chausée

\textsuperscript{18} compare the following chapter under c
d’Antin. The most majestic square of this kind if indisputably the space before St. Peter’s in Rome (fig. 423) including the Piazza Rusticucci and the colonnades are 340 meters long and 240 wide! The proportions are tremendous but can scarcely be called exaggerated.

The square consists of three parts; the above-mentioned Piazza Rusticucci surrounded by restaurants and shops, the great oval with its embracing Bernini colonnades, and the real square in front of the church which widens before the church portals and is bordered on either side by closed halls. The floor of the oval slopes gently down towards the centre where the famous obelisk rises from its pedestal with four candelabra about it. At the sides, to a certain extent in the focal points, more correctly in the chords of the colonnades, the two-basined iron fountains throw their mighty jets of water. The ground slopes up from the centre of the oval to the flight of steps which leads first to a wide landing and then to the vestibule of the cathedral. The horizontal cornices of the bordering halls rise gradually like the ground so that the eye of the spectator is everywhere guided upward to the portals of the first temple of Christendom.

Both Trinity Church in Paris and St. Peter’s Cathedral in Rome are instructive examples of the aesthetic demand that the ground on which a monumental edifice stands shall rise above the surrounding level. In addition the cathedral and the Severikirche in Erfurt, the Acropolis in Athens, the Villa d’Este in Tivoli, the Churches Santa Maria Maggiore and Santa Trinità de’Monti in Rome, the Votive church on Montmartre, the Trocadéro palace in Paris, the
pilgrim churches on the heights near Lyons and Marseille, the Palace of Justice in Brussels, the Bundespalast in Bern and the Hofburg in Buda should at least be called to mind here. Massive buildings belong on the heights, public gardens in the valleys or on the lower slopes of the city!

2) Covered spaces

In laying out a square in front of a building the sides and back of the latter are generally entirely neglected (if they are built in among other properties) or at best they receive only secondary consideration (if they are surrounded by narrow streets or alleys). The endeavor to leave enough open space about a building so that the architecture can be viewed from all sides results in the creation of those areas that we have designated above as covered spaces. Space enough to allow of a near view should as far as possible be provided on all the free sides of the structure; but the demand for space from which to obtain an effective distant view and the requirement that the site be raised will have to be limited to the principal angles from which the building is seen. The buildings concerned are generally churches, theatres or museums for which a position that leaves the building free on three or four sides is more or less necessary or desirable and which, in consequence of their architectural importance, may well claim prominent locations. As it is extraordinarily difficult and often impossible to create such sites in a city that is already laid out—in which respect Berlin should serve as a warning—it is a duty of prime importance, as was mentioned in part I, chapter 3, in making a city plan to provide suitable sites for public buildings on open spaces.

Figs. 426 & 430 show to what expedients it was necessary to resort in order to obtain open sites for the Lessing Theater in Berlin and the Reformes Church in Barmen. That these buildings had to be erected in a part of the town where the plan of the streets made no provision for such needs is the only excuse for such makeshifts, as the gable walls and buildings at the back of the adjoining properties can scarcely fail to disfigure the whole
In a similar manner but with better success St. Johns Church in Kopenhagen has been placed on the corner of a block apparently after the streets were laid out (fig. 427). In this case the neighboring boundary that form the background has been hidden by foliage. A more appropriate treatment would have been a group of buildings, connected with the church or at least belonging to it in place of the shrubbery.

It is not sufficient to appropriate any spaces that may happen to be left uncoverd in the network of streets to sites for public buildings as has been done with the Bethlehem Church and with Trinity Church in Berlin (fig. 431) which are placed without axial relations or other considerations of beauty. The triangles which are frequently formed at the ends of the blocks where the intersections of the streets is at acute angles may however be most successfully used for monumental buildings if their position and form is not left to chance, as is shown in fig. 432. The church of St. Augustin in Paris not only stands free on all sides but is also in line with and on the level of the Boulevard Malesherbes and the Square Delaborde forms a beautiful foreground from which to obtain a near view.

An equally effective arrangement of a site for a monumental building has already been given in the Paris Opera House (fig 70). Awkward building sites that interfere with the traffic have been illustrates in fig 73, the Karolinen-Platz in Vienna and fig. 67, the city hall square in Philadelphia. Even the Piazza di Castello in Turin, in spite of its large dimensions must be criticised in this respect because it lays too much restraint on the directions of traffic. This defect is also felt, though to a lesser degree, in the square that interrupts the course of the Landshuterstrasse in Schöneberg (fig. 428). Christ Church in
Cologne (fig. 499) on the contrary and the church square in Kiel illustrated in fig. 429, have been placed in such positions that they do not interfere with the traffic.

The space around monumental buildings should be neither too narrow nor too broad. Examples of both sorts are not rare. In order to correct a cramped appearance buildings that stand too near the main edifice are frequently demolished such “clearings” are risky and easily lead to exaggerations (compare chapter 8 of this part) so that the evil lying at the other extrem takes the place of the first one and the emptiness of the surroundings makes the building appear small. In such cases efforts are made to remove the bleak wastelike appearance by planting shrubbery, dividing the open spaces, setting up statuary and ornamental structures. An example of this is seen in the Bühlen-Alliance-Platz in Berlin (fig. 471). The disproportion between the thin column and the wide open space was formerly very striking but has been greatly relieved by the transformation the area has undergone. Perhaps the Feuersee-Platz in Stuttgart also suffers in its relation to the Johannis kirche by being of such large dimensions. The space about the Votivkirche in Vienna may safely be said to overstep the boundaries of what is permissible (compare fig. 491).

It is naturally difficult in making a city plan to avoid errors between the measurements of open spaces and of the buildings to be erected on them if the latter are not yet known. It is possible however greatly to reduce the number of errors if the designer will only bring the measurements of the space into harmony with the size of the building as he imagines it; as a rule he will have to leave the rest to the good sense of others in the future.

Finally, as examples of what covered spaces should be the following may be mentioned: the Madeleine in Paris, the cathedral square in Orléans, the Münsterplatz in Reims, Thomas-Kirchplatz and Michaels-Kirchplatz in Berlin, all with axial relations and sufficient open spaces around them, in addition the Münsterplatz in Ulm and Freiburg i. B. (figs. 424 & 425). In Freiburg the view from the Kaiserstrasse, through the short Münster gasse, of the mighty tower is wonderful and that of the Münster in Strassburg is similar. The Domplatz in Cologne has indeed been brought into proper relation to the gigantic edifice by the demolition of surrounding buildings but artistic treatment of the open space thus created is lacking.

Among covered spaces the Gendarmenmarkt in Berlin (fig. 433) holds a peculiar position being the site not of a single building but of three. In general the formation of a square by leaving free three rectangular building blocks in a row cannot be recommended. Also the designer of a city plan must give way to the temptation to create a square on
which only two buildings of equal merit or a group of buildings can be placed only when
the rare need is already present. In the Gendarmenmarkt in Berlin however it must be
acknowledged with appreciation that its measurements suit the three buildings admirably.

Buildings situated on squares and that are free or three or four sides are those that
most govern the appearance of the city for they more than others are apt to determine
the directions of the streets and to form the terminal points of the lines of view. It is
well known that in this respect the metropolis on the Seine far surpasses all other cities.
The Arc de Triomphe, the Opera House, the above mentioned churches St. Augustin and
St. Trinité, the churches Notre Dame de Lorette, St. Vincent de Paul, de la Madeleine,
the Strassburg railway station, the Central Halls, the Trocadéro-Palace, the Cathedral Des
Invalides, the Luxemburg Palace, the Odeon, the Pantheon, the Belvedere of the Buttes
Chaumont and many other celebrated edifices form the terminations of one or several
larger or smaller streets. Some other streets are so charmingly planned that they possess
architectural termination an architectural termination not directly but over the tops of
intervening groups of houses; fine examples of this sort are the Boulevard St. Michel, which
seen from from the south towards the north looks beyond the Seine over the group of court
buildings towards the turret of St. Chapelle and the Avenue de Friedland the view from
which is indirectly of the dome of St. Augustin. This makes the city extraordinarily rich in
architectural views the effect of which is frequently enhanced by placing the buildings on
raised sites and bringing them into relation with lower lying garden areas. (Madeleine, St.
Trinité, St. Vincent de Paul, St. Sulpice, Ste. Clotilde, Trocadéro, Sacre- Coeur etc).

Other examples of beautiful indirect street perspectives are Whitehall Street in London which looks across the buildings lying between to the Houses of Parliament, the view from the main railway station in Elberfeld across the Wupper bridge to the town, above which, in the line of the street, The Herz- Jesu- Kirche towers from the height on which it stands, the view of the Elisabeth-Kirche from the Steinentor in Basel, and so on. In such charming and picturesque views, the result more of fortunate chance than of intention, our fine German mediaeval towns are particularly rich, for instance, Nürnberg, Braunschweig, Hildesheim and Lübeck.

![Göcke's draft for remodeling the place in Fig.401](image-url)
At the same time in planning street views wise moderation is necessary. Long and wide traffic streets cannot terminate in ornamental buildings or monuments without detracting from the effect of the latter. A warning example is the wide Bahnhofstrasse in Löwen which has been extended through to the town hall and thus lays bare the graceful edifice in a really unpleasant manner. Mediaeval buildings especially should not have too wide a setting; in focusing the streets upon them and demolishing the buildings about them it is easy to go too far, as has actually been done in the case of Milan Cathedral and Notre Dame in Paris. (Compare also chapter 8, marginal heading 282)

3) Areas surrounded by Buildings

Areas surrounded by buildings may be called the festive halls of the city, just as the streets may be linked to the passages in the plan of a building, the gates and traffic centres to the entrances and vestibules, the market places to the business localities the garden areas to the living rooms. These surrounded architectural spaces do not need the long perspective of streets, they carry the certainty of artistic effect in themselves if proper attention is paid to their shape, to the height and grouping of the buildings about them and to their dimensions.

Regularity of shape is not a necessity, as well-known imposing areas prove. Irregularity however should not be created with intention; but must be the result of historical growth or be based on local building conditions. When this is the case an irregular space may be particularly fine and picturesque.

The level is of great importance. A space that has a decided rise in the direction from which the principal view of it is obtained, or that is noticeably uneven, is not adapted to the erection of monumental buildings. As the latter require a raised position it is indeed permissible to chose the upper side of a sloping space for a site and to use the slanting ground for a terraced or planted garden of approach; but the other three sides are more or
less unsuitable for monumental buildings. A slight rise is scarcely noticeable or is easily concealed. An instance of the intentional sinking of the center of a space was given in fig. 423, in the description of St. Peter’s in Rome. Even if the desirability of such an artificial sinking be doubtful, the principle that underlies it will always prevent our raising the center of a square artificially, which, it is to be regretted, is frequently and unnecessarily done.

A space surrounded by buildings, like a picture, requires a closed frame around it. A space that opens into streets in several directions and that is arranged so that one can look far into the streets does not give the impression of a stately architectural area but only of a noisy extension of the streets themselves. Even artistic walls or foliage are insufficient frames for these areas. Buildings standing close together between which the intersection of the streets is kept very subordinate, or at least arcades and open halls must enclose the space and they must be so grouped that balance is preserved in the distribution of masses and variety in the unity is assured.

Correct dimensions can scarcely be expressed in universally applicable figures. If therefore the rules laid down by Maertens¹ some of which are given in the next chapter (marginal heading 259) cannot claim unconditional correctness, yet they give the city planner a series of important points of view. The space must be large enough to afford a view of all the buildings that surround it from the most desirable distance. Too large spaces detract from the importance and effect of the buildings (Friedrich-Platz in Kassel, Rathausplatz in Vienna, Szechenyi-Platz in Szegedin, also Königsplatz in Munich,

---

¹ Maertens, H der optische Massstab etc. 2nd ed. Berlin 1884
Augustus-Platz in Leipzig, Kaiserplatz in Strassburg). Too small spaces do not afford the desired points of view.

Figs 434 to 446 show a number of spaces surrounded by buildings. We see first in fig. 435, the Grande Place in the old Flemish town of Veurne (fr.Furnes), which though little known is highly remarkable on account of its fine old buildings.

The principal buildings, the town hall and the court house, with a narrow carriage thoroughfare between them stand in a corner of the square without axial relations. The cathedral stands near-by, rising above the little gabled houses that surround the open space. The latter slopes downward towards the center. The whole presents a picturesque scene of unusual charm.

The market place in Lübeck shows a closely related arrangement.

In one corner stands the town hall together with the stock exchange. Here too an archway leads through to the neighboring streets. The post office stands on the long side opposite, while St. Mary’s church towers above the little houses about the market. A fountain, which unfortunately is lacking in Veurne, ornaments the square.

The Alte Markt in Stralsund (fig.436) also shows besides the quaint old town hall, the Nikolai-Kirche rising behind the row of houses.

Similar arrangements are found in the mediaeval market-places of many other towns, for instance, Cologne (fig. 381), Bremen (fig. 438) where, though numerous streets run into the space, it is impossible to see far into them; Breslau, Kiel, Krakau and others, a detailed account of which would take us too far. A very frequent arrangement is to build the town hall on the square but the church in a somewhat more retired position near-by (Aachen, Schwerin, Stralsund, Lübeck, Kiel, Neuss, Geldern, Veurne, Krakau, etc.)

Fig. 439 (Marketplace in Potsdam) shows another solution. The church does indeed stand out in the center of an open space but also, together with the town hall and two palaces, forms the frame of the main part of the square.

One of the most widely known and celebrated squares is St. Mark’s in Venice (fig.441) which with a length of 175 meters increases in width from 58 to 90 meters.

It is enclosed by the two procurators residences, St. Mark’s Church and a part of the palace of the Dodies. The principal view, looking down the length of the square, is of St. Mark’s which however does not stand in the axis of the space. Its uneven position is concealed by the Campanile which stands on the broad side of the square, and the three well known flag-poles. The Piazzetta, which is sharply separated from the Piazza by the Campanile is in reality merely the street leading from the lagoons to the square but the
Fig. 408
Garden place situated offside from traffic.

Fig. 409
Garden place situated along a street on one side.

Fig. 410
Beethoven Platz in Cologne.

Fig. 411
Double playground on Sachsenring in Cologne.

Fig. 412
Playground in connection with a gardenlike recreational place.

Fig. 413
Forecourt of San Carlo in MAdland.
buildings that border it and the two ornamental columns on the strand give it the effect of an independent square. (The reconstruction of the collapsed Campanile should be hailed with joy because it restores not only the historic scene but also the division of the square. 

Modest in size but very charming is the Piazza dell’Annunziata in Florence (fig. 442). It is bordered by the Annunciata Church and the colonnades of two other imposing buildings and is ornamented with a equestrian statue of Ferdinand I and two pretty fountains. In Verona there is the very beautiful little Piazza d’Signori and the more extensive Piazza Brà. But the finest square of the kind under discussion is undoubtedly that in front of the Capitol in Rome. It was planned by Michelangelo himself in such a way that it grows wider as it slopes downward, thus drawing the frame, as it were, closer about the picture and making the square itself appear larger than it is (fig. 437). 

Pedestrians mount the steep approach and step between the Dioskuri that crown the ascent into the axis of the square which is surrounded on three sides by venerable palaces and bears in the center the famous iron equestrian Statue of Marcus Aurelius. On the right side of the approach a driveway winds to the top of the ascent, on the left a wide flight of steps leads to the church Sta. Maria in Aracoeli. 

Among the finest squares in Europe must be reckoned the Stanislaus Square in Nancy (fig. 440)

The principal side is formed by the magnificent town hall; at the two ends are palace facades of equal heights; the fourth side is bordered by low cafés which form the foreground of a fine triumphal arch, the entrance to the way leading to the Place de la Carrière. The four corners and the Rue Ste- Cathérine, which leads down from the place, are closed by gilded iron railings in three of which there are gates whereas the other two stand behind beautiful fountains. Only the main approach Stanislaus Street, opens directly on the square the center of which is occupied by the statue of Stanislaus Lesczynski. 

The Place Vendôme in Paris (fig. 446) cannot compete with the Stanislaus Square although it is surrounded by equally high palaces and ornamented with the famous column. The corners of the square are cut off and the centres of the long sides are emphasized by being somewhat built out into the square. One disadvantage of this area and also of the Stanislaus Square is that vehicles that drive across its full length.

This is also the case with the Amalieborg Square in Copenhagen (fig. 443) which
is otherwise almost unique of its kind being enclosed by four similar state buildings and adorned with a triumphal arch at the entrance to the Amalienstrasse and an equestrian statue in the center. Opportunities to build squares like it offer themselves very rarely. In the first place the crossing of two streets is suited to such a space only if the traffic is insignificant and will remain so and in the second the possibility of grouping four similar monumental edifices together is quite exceptional.

The proportion of the Amalieborg Square are good whereas those of the Königsplatz in Munich, illustrated in fig. 444 are exaggerated. The three structures, the Glyptothek, the Art Exhibition Building and the Propyläen would appear much more significant if the square were about a third smaller. The Rathausplatz in Vienna suffers still more from exaggerated dimensions. Even such imposing buildings as the new city hall, the university, the parliament building and the new imperial theatre are not able effectively to enclose a space 200 x 400 m in size. It was necessary to cover the area with two small parks; the consequence of which is that one can overlook the great space, as it was intended in the plan, only from the upper stories of the buildings. In this respect the Lustgarten in Berlin is incomparably more beautiful. It is scarcely half as large and therefore affords a much better view of the buildings in relation to one another. The Schlossplatz in Stuttgart, which is exceedingly beautiful as a garden area is too large to be effective as an architectural square.

A modification of “built-about” architectural aereas are the spaces sometimes found in the interior of large buildings which yet are open to public traffic. Such “inside squares” occur only as exceptions and then generally in royal palaces. It will suffice to mention as examples the Franzens-Platz in the Imperial Palace in Vienna, the Zwinger in Dresden, the courtyard of the Palace of the Doges in Venice, the Place du Carrousel in the Tuileries and the inside square in the Palais Royal in Paris which is decorated with gardens and surrounded by colonnades and shops.

In fig. 445 the Zwinger in Dresden is sketched
Fig. 388.

Piazza Santa Croce in Florence

Fig. 389.

Piazza Santa Croce in Florence

Appellhofplatz in Cologne

Fig. 421.

Appellhofplatz in Cologne

St. Moritz Platz in Lille

Fig. 422.

forecourt of the Dreifaltigkeitskirche in Paris

St. Petersplatz in Rome

Fig. 423.

St. Petersplatz in Rome
without its inside decorations, in the form that Semper proposed for it. What is today the transverse axis was to have been the major axis and to have extended to the Elbe. The inside square which is concave in form is a little gem of city building.

These inside squares lead on to the courtyards of German castles and Italian palaces, which are not treated of here.²

From inside squares and courtyards the endeavor to create a unified architectural border has extended to open city spaces and even to streets. In addition to the above mentioned squares unified palace facades are found most frequently in Italian squares (for instance, Piazza alla Croce, and Piazza Cavour in Florence, Piazza Vittorio Emanuele in Rom). This endeavor can only be approved where really monumental buildings are concerned and even then balanced masses of different styles of architecture are to be preferred to monotony of form. The forced grouping of ordinary dwelling houses behind long uniform facades is an objectionable mochery and at the same time far from beautiful. Regent’s Quadrant in London is a warning example of such uniformity.

² see part IV of this handbook, chapter 3, courts
Fig. 427
St. Johannis Place in Copenhagen

Fig. 428
Churchplace in Berlin-Schöneberg

Fig. 429
Churchplace in Kiel

Fig. 430
construction site of the new reform church in Barmen

Fig. 431
Dreifaltigkeits Church in Berlin
The fact that monumental areas are treated of here as a special kind of square does not mean that a particular sort of space must be made for the erection of statues, memorial columns etc. On the contrary, as we have seen and the examples cited have shown, monuments may be suitably erected on street expansions, traffic centres, market places, garden areas, squares in front of public buildings and architectural squares. Many areas however are entirely unsuitable while others are especially adapted to the erection of monuments. Greater care is necessary if a monument forms the principal object in an area, that is, when it is a monumental square in the narrow sense.

It is inadmissible to place a monument in one or more lines of vision, needless as to whether or not it intercepts the view or interferes with the traffic and without taking care that the street view is in proper relation to the statue. Thus the Piazza Savoia in Turin (fig.447) apart from the awkward arrangement of the square itself, is an entirely unsuitable place for the monument. The same fault may be found with the Piazza Carlo Emanuele in Turin (fig. 448) although it does not interfere with traffic to such an extent. Even on the Luisen-Platz in Darmstadt the column with its massive pedestal that forms such a stately termination to the Rheinstrasse makes itself felt to a certain extent as a hindrance to traffic (fig. 449). This is not so noticeable in the Bahnofplatz in Lüwen (fig. 453) where the traffic to and from the station passes quite naturally round the Van-de-Weyer monument. The Thiers monument in the station square in Nancy (fig. 452) also interferes as little with traffic as does the Ernst August monument of the Bahnofplatz in Hannover (fig. 366). The Boduognatus monument in Antwerp (fig.454) standing as it does out of the way of traffic, is better placed than the Max monument in the Maximilianstrasse in Munich (fig. 455) though in the former case the traffic connection between the Avenue Charlotte and the Avenue des Nerviens suffers considerably.
Fig. 434  
market place in Lübeck

Fig. 435  
Groote Plaats in Veurne

Fig. 436  
Alter Markt in Stralsund

Fig. 437  
Piazza del Campidoglio in Rome

Fig. 438  
Marketplace in Bremen
The Piazza dello Statuto in Turin (fig. 450) is an exceptionally fine monumental square. The pyramid of rock out of which water trickles and which bears marble figures representing successful work, rises, crowned by the allegorical figure of an angel, as the terminal point of the long Via di Dora Grossa. The space between the end of this street and the monument, which commemorates the closer connection of the peoples brought about by the tunneling of Mont Cenis, is planted with flower beds.

Still finer is the Place de la Concorde in Paris (fig. 451), in size and arrangement the richest monumental area in Europe. It is surrounded by a massive stone parapet, the eight corners of which are occupied by the huge symbolic figures of eight French towns that guard, so to speak, the entrances which are decorated with magnificent candelabra. The famous Obelisk of Luxor and two fountains with several basins stand on a long shaped field in the centre of the place thus enclosed. From the centre looking down the streets that open onto the square four magnificent distant views are obtained of prominent buildings in the city. A great defect of the square is that the surroundings are too open to be artistic. The effect of the whole would be quite different and incomparably more beautiful if the surroundings, which consist of the Tuileries garden on three sides, the Champs Elysée and the Seine, formed a closer boundary. The latter is an advantage possessed by Trafalgar Square in London (fig. 456) which, although the space within its parapets is scarcely more than 100 x 100 m, makes a greater impression on the visitor. Both squares, being free from planted areas, are entirely open to the people and serve for public meetings and festivals. A terrace runs along the side of Trafalgar Square facing the National Gallery and the surface of the square which it overlooks is ornamented with Nelson’s column, which rises to a great height, statues of Napier and Havelock and two fountain basins. The equestrian statue of Charles I which stands on the street crossing at Charing Cross looks very insignificant opposite to the other statuary.

We shall devote chapter 7 in part V to a more thorough consideration of the manner in which monuments should be erected on squares and streets.
Fig. 441
St. Markus Place in Venice

Fig. 442
Piazza dell’Annunziata in Florence

Fig. 443
Amalieborg Place in Copenhagen
5) City Gate Areas

If among architectural areas we lay special emphasize on “city gate areas” it is because in planning the expansion of cities today we are so often confronted with the problem of meeting the demands of increased traffic without destroying valuable entrance structures either of mediaeval or more modern origin. Many of our German towns have been robbed of their mediaeval gate towers owing partly to their being considered a hindrance to traffic, and partly to a lack of artistic understanding. Only a few of those not in all cases even the finest have been preserved. But everywhere where such town gates have been saved from destruction and their surroundings adapted to meet the new demands of traffic, these old structures stand not only as venerable witnesses of history but serve also in great measure to beautify the town. Figs. 457 to 464 present a number of examples. Fig. 459 shows how a path for pedestrians was made beside the old Martins-Tor in Freiburg i. B. as there was not space for one beneath the arch through which vehicles pass. If the need should arise a second sidewalk might be cut through on the other side of the street without destroying the connection between the archway and the street wall. (Has since been done). In Eisenach (fig.457) the entrance to the town leads past the Nicolaistor or Bahnhofstor which has been successfully restored by Stier after a struggle with levelling difficulties, while the old gate tower is used only as an exit. Thoroughfares have been opened on both sides of the Eschenheimer Turm in Frankfurt a.M. (fig.458) so that traffic through the gateway is relieved as far as possible. Similar arrangements are found in Nürnberg (figs 519 to 521), Heidelberg, Stendal, Basel (Spalentor fig. 460), Schaffhausen and other places.

Temple Bar, the old gateway between the city and the Westend in London, has had indeed to give way to the tremendous traffic; but the Temple Bar Memorial, a pillared structure on the sides of which stand statues of Queen Victoria and the Prince of Wales, has been erected in the middle of the street to commemorate the historic spot, though it too noticeably affects traffic.

While no real squares have been laid out about any of the gateways just mentioned, the Isartor in Munich (fig. 462) which, together with the Zwinger, is preserved as a thoroughfare, is surrounded by a regular square which is intersected by six streets. The old Hahnentorburg in Cologne (fig. 464) is connected with the Rudolfsplatz an open garden area in such a manner that the gateway is used only by pedestrians, vehicles being obliged to drive round, In this case the main traffic does not enter the Hahnenstrasse which lies behind the gate, but is along the Mittelstrasse which was cut through for this purpose.

More parklike in character are the surroundings of the Hal’sche Tor in Brussels which no longer serves its original purpose but stands in a garden area beside the Boulevard and is arranged as a museum of weapons.

The Berliner Tor in Wesel and the Holstentor in Lübeck (fig. 461) like the Cologne Hahnentor are used only by foot passengers while carriage thoroughfares lead around them. Although the effect of the planted area in Lübeck is very bright and cheerful the arch unfortunately looks as if it had sunk into the ground, the surroundings also might well be more in keeping.
Fig. 444
Königsplatz in Munich

Fig. 445
Zwinger in Dresden

Fig. 446
Place Vendôme in Paris

Fig. 447
Piazza Savoia in Turin

Fig. 448
Piazza Carlo Emanuele in Turin
The Ponttor in Aachen (fig. 466) acts as a boundary to the park areas of the Ludwigsallee on the one side and forms the wall about an enclosed section of a square on the other.

The Paris gate in Lille (fig. 467) stands like a triumphal arch on a rounded out street crossing. The Porte de St. Denis in Paris (fig. 463) is so placed that the Boulevard driveway passes it without hindrance whereas it interferes to a certain extent with the traffic turning into the Foubourg St. Denis. Two Florentine town gate areas have already been discussed in figs. 373 and 375.

In conclusion mention should be made of a modern city gate with its adjoining square, the Brandenburger Tor in Berlin (fig. 465).

It contains one main carriage thoroughfare and four side driveways while the contiguous colonades serve for foot travel. An open square, the Pariser Platz, adjoins the gate and forms the beautiful starting point of the magnificent street, Unter den Linden. The square is open to traffic the whole breadth of the street while the extensions on the sides are decorated with ornamental planted areas. Together with its surroundings the Pariser Platz forms a worthy vestibule for the capital of the German Empire as does the Piazza del Popolo (fig. 367) for Rome.

6) Double Squares

Under the marginal heading 187 the fact was mentioned that one and the same area often serves various purposes. It is not always possible therefore to classify the existing open spaces of a town as belonging to any one of the different kinds of areas already discussed. In planning city expansion also the need is often felt of making one space serve several purposes, for instance, as a market place and architectural area, or as a garden area and monumental square. In such cases it is the more necessary to consider carefully and meet as far as possible the increased number of requirements. Traffic squares and centres are least suited to be used for other purposes. It is therefore often found necessary, if the need of another kind of area is felt at the spot where a traffic center lies, to
make adjoining it a second square of the desired kind. In this way twin or double squares are formed.

The distinct natures of the two areas in such a double square are clearly seen in figs. 468 & 471, the Potsdamer Platz and Hallesches Tor in Berlin. Outside of the real entrance to the city the streets which come together at this point are united in a decided traffic square while on the inside of the former gates in both cases a spacious garden area has been laid out. For the regulation and safety of the enormous traffic the Potsdamer Platz is differently divided
today from what is shown in fig.468. But no arrangement can be really adequate for, owing to various conditions, the inhabitants of an outlying city district who number perhaps half a million, are obliged to enter the centre of the city just at this point, which has resulted in a tremendous increase in the traffic.

In front of the principal railway station in Milan (fig. 472) a large open space serves as a public traffic square; the streets leading down from it to the Porta di Venezia enclose a spacious garden area above which rises the traffic square, on a high supporting wall-a double square of unusually large dimensions and favorable effect.

Equally attractive is the arrangement of the Piazza Acquaverde in Genoa (fig.470). The lower half of the area lying in front of the tower and the descent to the railway station, is divided by different levels into foot and carriage ways and serves as a traffic square. The upper portion of the area, surrounded by the parkway like streets that lead from the Via Balbi up to the hillside, is the site of the Christopher Columbus monument and is laid out in lawns planted with flowers and shrubbery.

The Piazza Grande in Triest (fig. 469) is an example of the frequently occurring combination of an enclosed garden area, which is in this case traversed by foot paths and open to the public and an architectural square. The latter lies in front of the city hall and is ornamented with a fountain and two stately candelabra decorated with figures.

Finally in fig. 473 we give an illustration of another frequent combination: an architectural space before a large building and a traffic centre. Above the Place de la Fayette rises the church St. Vincent de Paul from a terrace laid out in lawns and flower beds, thus also forming the terminal point of the Rue d’Hauteville which ascends in a gently concave line from the Boulevard Bonne-Nouvelle.
Fig. 456
Trafalgar Square in London

Fig. 457
Eschenheimer gate in Frankfurt a. M.

Fig. 458
Martins gate in Freiburg i. B.

Fig. 459
Gate at the station in Eisenach

Fig. 460
Spalentor in Basel
Fig. 461
Holstentor in Lübeck

Fig. 463
Porte St. Denis in Paris

Fig. 464
Rudolfsplatz in Cologne

Fig. 465
Brandenburger Tor and Pariser Platz in Berlin
Fig. 466
surrounding of the Ponttor in Aachen

Fig. 467
Paris gate in Lille
Fig. 468
Leipziger and Potsdamer Platz in Berlin

Fig. 469
Piazza Granda in Triest

Fig. 470
Piazza Acquaverde in Genua

Fig. 471
Belle Alliance Platz and Hallerscher Torplatz in Berlin
Abb. 472
Place in front of the railway station in Milano
In making a city plan open spaces are the best means of embellishments at the architect’s command. Once laid out, alteration and improvement is the more difficult and telling the closer their connection is with the directions of the streets and with groups of buildings. The situation, the form and the adornment of these areas is therefore one of the most important tasks in planning a city. The lack of understanding of these matters that is unfortunately so often met with in finished city plans is the author’s justification for treating the subject at such length.

f) Comparison of the Dimensions of different areas

As it was unfortunately impossible to use the same scale in all our illustrations the reader may compare the dimensions of well known city squares by the following table in which the areas are arranged according to their approximate measurements.

In these measurements the streets that border the squares are always included so that the last column gives the size of the open space between the buildings. The table shows clearly that the beauty of an area by no means increases with its size. The charming squares in Lübeck, Bremen, and on the Capitol in Rome have a surface area of only from 4300 to 5000 square meters; the celebrated squares in Nancy and Venice only between 10000 and 15000, the Piazza del Popolo and Trafalgar Square about 20000. The enormous dimensions of the Gendarmenmarkt in Berlin and St. Peter’s Square in Rome do not detract from their fine appearance only because in one case several majestic buildings divide the space and in the other the mobile outline, the grand setting and the effective arrangement of elevations are all calculated to direct the gaze to St. Peter’s church. Yet it is open to doubt whether the effect of the latter would not have been enhanced by making the square just a little smaller. The four largest areas and several others suffer decidedly from the exaggerated scale on which they are laid out.
<table>
<thead>
<tr>
<th>Name</th>
<th>Broadth (meter)</th>
<th>Length (meter)</th>
<th>Area in sq m (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Königsplatz, Berlin</td>
<td>230</td>
<td>460</td>
<td>105000</td>
</tr>
<tr>
<td>same, including the little Königsplatz</td>
<td>-</td>
<td>-</td>
<td>134000</td>
</tr>
<tr>
<td>Rathausplatz, Vienna</td>
<td>200</td>
<td>400</td>
<td>80000</td>
</tr>
<tr>
<td>Place de la Concorde</td>
<td>220</td>
<td>360</td>
<td>79000</td>
</tr>
<tr>
<td>Place de l’Etoile</td>
<td>275</td>
<td>diameter</td>
<td>59000</td>
</tr>
<tr>
<td>St. Peter’s Square</td>
<td>240</td>
<td>340</td>
<td>57000</td>
</tr>
<tr>
<td>Frirdrichs Platz, Kassel</td>
<td>165</td>
<td>340</td>
<td>56000</td>
</tr>
<tr>
<td>Place des Nations, Paris</td>
<td>262</td>
<td>diameter</td>
<td>54000</td>
</tr>
<tr>
<td>Gendarmenmarkt</td>
<td>155</td>
<td>340</td>
<td>53000</td>
</tr>
<tr>
<td>Piazza Vittorio Emanuele, Rom</td>
<td>165</td>
<td>315</td>
<td>52000</td>
</tr>
<tr>
<td>Szchenyi Square, Szegedin</td>
<td>170</td>
<td>300</td>
<td>51000</td>
</tr>
<tr>
<td>Station Square, Milan</td>
<td>200</td>
<td>210</td>
<td>42000</td>
</tr>
<tr>
<td>Lustgarten, Berlin</td>
<td>180</td>
<td>230</td>
<td>41000</td>
</tr>
<tr>
<td>Schlossplatz, Stuttgart</td>
<td>180</td>
<td>210</td>
<td>38000</td>
</tr>
<tr>
<td>Piazza Cavour, Florence</td>
<td>180</td>
<td>180</td>
<td>32000</td>
</tr>
<tr>
<td>Kaiserplatz Strassburg</td>
<td>170</td>
<td>185</td>
<td>31000</td>
</tr>
<tr>
<td>Königsplatz, Cologne</td>
<td>120</td>
<td>232</td>
<td>26000</td>
</tr>
</tbody>
</table>

---

meter | meter | squaremeter
<table>
<thead>
<tr>
<th>Location</th>
<th>Broadth (meters)</th>
<th>Length (meters)</th>
<th>Area in sq. meter (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neumarkt, Cologne</td>
<td>113</td>
<td>240</td>
<td>27000</td>
</tr>
<tr>
<td>Trafalgar-Square, London</td>
<td>145</td>
<td>155</td>
<td>22000</td>
</tr>
<tr>
<td>Königsplatz, Munich</td>
<td>120</td>
<td>185</td>
<td>22000</td>
</tr>
<tr>
<td>Dönhoff-Platz, Berlin</td>
<td>120</td>
<td>180</td>
<td>22000</td>
</tr>
<tr>
<td>Piazza del Popolo, Rom</td>
<td>150</td>
<td>180</td>
<td>20000</td>
</tr>
<tr>
<td>Piazza Grande</td>
<td>100</td>
<td>190</td>
<td>19000</td>
</tr>
<tr>
<td>Albert-Platz, Dresden</td>
<td>155</td>
<td>diameter</td>
<td>19000</td>
</tr>
<tr>
<td>Bahnhofsplatz, Hannover</td>
<td>100</td>
<td>200</td>
<td>18000</td>
</tr>
<tr>
<td>Wilhelms-Platz, Berlin</td>
<td>98</td>
<td>176</td>
<td>17000</td>
</tr>
<tr>
<td>Königsplatz, Kassel</td>
<td>140</td>
<td>diameter</td>
<td>15400</td>
</tr>
<tr>
<td>S t. Mark's Sq., Venice</td>
<td>58+90 /2</td>
<td>175</td>
<td>13000</td>
</tr>
<tr>
<td>Stanislaus Sq., Nancy</td>
<td>100</td>
<td>120</td>
<td>12000</td>
</tr>
<tr>
<td>Altermarkt, Cologne</td>
<td>48</td>
<td>145</td>
<td>7000</td>
</tr>
<tr>
<td>Marktplatz, Lübeck</td>
<td>60</td>
<td>85</td>
<td>5000</td>
</tr>
<tr>
<td>Capitol, Sq. Rome</td>
<td>48+68/2</td>
<td>79</td>
<td>4500</td>
</tr>
<tr>
<td>Marktplatz, Bremen</td>
<td>63</td>
<td>68</td>
<td>4300</td>
</tr>
<tr>
<td></td>
<td>meter</td>
<td>meter</td>
<td>sq.meter</td>
</tr>
</tbody>
</table>
Place de la Fayette an forcourt of the church St. Vincent de Paul in Paris
PART II

CHAPTER 7:
The Artistic Side of Open Spaces

The arrangement and laying out of public squares is the most important artistic task in city building. Its successful accomplishment is one of the fundamental conditions for the satisfactory appearance of the town. It is therefore advisable to collect here and properly arrange the artistic requirements of public squares that are scattered through the foregoing chapter, to discuss them connectedly and further to supplement them from an artistic point of view. There follows a short historical review, after which we shall take up in order the surroundings or settings of squares, their proportions and dimensions, their relation to monumental structures, their grouping, equipment, division and arrangement, and their levels.

a) Historical Review.

Among the ancients the building of the city in general and the laying out of public squares in particular was more often considered as a work of art that it is today. Pausanias and Aristoteles spoke of the possession of public squares and public buildings as necessary to the conception of the city, and Aristoteles laid down the wise principles for guidance in building artistic and beautiful cities. The ancient city squares took the place of modern public halls for public gatherings and festivals.

The Greek name for these areas is therefore Agora (meaning originally “people’s meeting”). It was square or rectangular in shape usually enclosed by colonnades with an open gallery on top, surrounded by temples and other public buildings, ornamented with statues of gods and heroes and other art treasures; a gate with columns formed the entrance. That was the Greek council place. A second square not so richly appointed served as a market; but of still greater artistic importance were the places of worship. The temple areas of Acropolis, in Pergamon, in Eleusis, in Olympia and elsewhere were noble creations of the art of city building, public squares and festival squares of the first rank.

The Roman public square was the Forum. The former arrangement of the Roman forum in Arles, in southern France, is shown in fig.474. What has been preserved of the forum in Rome, in Pompei, (see illustration in part 5, chapter 7) and in other places give us an idea of the former magnificence of these ancient “festival halls” of the city. Vitruv has described to us the construction of the Roman forums and other writers have pictured the life that went on there.
There too we find columned structures, temples and other imposing edifices as surroundings, as well as statues, altars and even whole temples on the squares themselves. A distinction must be made between the Forum civile, the real place of council, justice, elections etc., and the Fora venalia, the markets. The Fora were also used for shows, gladiatorial struggles, and so on, although the theaters, palestras, and thermas, served the same and similar purposes. Many public squares and Italian towns (for instance Plazza Navona and Piazza di Termini in Rome) are the remains of such ancient areas, whose fundamental characteristics - free, uncovered surfaces and closely built surroundings or “frames” - are reflected in the courtyards of old Roman dwellings and in their descendents, the courtyards surrounded by galleries in southern European town houses.

In the Middle Ages in Italy there were three distinct squares: the Signoria, the worldly square, usually serving as the approach to the finest palace, surrounded by other public buildings and often adorned with a loggia, or pillared hall used as a platform and as a main-guard room; the cathedral or church square on and about which were assembled the church, the special baptistry, the Campanile and the bishop’s palace; finally the mercato, that is, the market-place with fountains and weighing scales and municipal government buildings. Signoria and mercato have their predecessors in the ancient squares but the church squares has not. The church was usually built on it connected on one or more sides with cloisters, schools and similar structures. Sometimes the cathedral square with its various buildings became the finest spot in the city, comparable to the Greek temple areas; this is the case in Pisa for instance, where even today cathedral and baptistry, bell-tower and Campo Santo display their marble eloquence in majestic harmony.

The German towns of the Middle Ages used the market-place for public gatherings and festivals. It was also the town hall and square and fountains and monuments stood there. In the preceding chapter we gave numerous examples and also pointed out the fact that the church buildings in contrast to the town hall which stood on or facing the market, generally stood in more retired and frequently quite cramped surroundings. They were often attached to cloisters,
convents or seminaries but sometimes stood alone in church-yards or squares of their own. Whichever way they were erected they have provided our modern cities with many beautiful church squares, for the church-yards later ceased to be burial grounds and the many small buildings that crowded about embraced cathedrals and churches like a circle of parasites after the Middle Ages, were afterwards torn down. This clearing away of surrounding structures may however be carried to too great length as will be shown in chapter 8 of this part.

The squares laid out during the Renaissance were copied from the old Roman models, from the fora but also from the thermae, the theater and circus squares. Particularly in Italy they were frequently enclosed by pillared halls, either standing separate or connected with the houses, and were either straight or curved in outline. They were decorated with obelisks, statues and fountains, and reached the height of their development during the Baroque period. Under heading 231 we have already discussed St. Mark’s Square with its straight surroundings after the manner of the fora and the Piazza del Popolo and St. Peter’s Square with their curved outline-structures were described under heading 217. Besides the squares that are entirely enclosed we find also some that, like stages, are shut in on three sides and open on the fourth, the spectators’ side; among them are square in the front of the Palazzo Pitti and the Piazza dell’ Annunziata in Florence (fig. 442), the Piazza Colonna in Rome (fig. 418) and especially the Capitol Square (fig. 437). With the rise of the new style of art the Italian squares were imitated all over Europe. Particularly in Spain, France and Germany the later Renaissance and the Baroque period created many remarkable works of this kind. The Plaza Mayores in Madrid, Salamanca, Bilboa and elsewhere are closed and surrounded by buildings and halls. We owe to that time that was especially
successful and enterprising in its arrangement of masses, the Stanislaus Square in Nancy (fig. 440), the Tuileries and the Place des Vosges in Paris, the squares before the palace and the Brandenburger Tor in Berlin, the Residenz squares in Vienna, Versailles, Stuttgart, Karlsruhe, Würzburg, Koblenz, Braunschweig and Gotha; also numerous squares in front of public buildings, the front and two sides of which are usually formed by the building with its two wings. In fig. 475 we have an illustration of a square such as is found in very many places.

In spite of Schinkel and Semper the nineteenth century accomplished little that was artistic in the way of city-building notwithstanding that in the second half the growth of city life and city expansion was greater than perhaps ever before. Even today the work of geometrist and the activity of the land speculator frequently take the place of the plan of the architect. The work of a surveyor and the enterprise of the business man are certainly indispensable; but only the penetration of the whole by the idea of artistic building will be able to raise city-building from its present low status and place it beside the accomplishments of earlier artistic periods. Unless all signs fail we, in Germany, are on the way to a healthy development, the artistic part of which we owe especially to Sitte’s endeavors. Artistic activity seems to be weakest in North American city-building. There the striving after uniformity, quickness and money making seems so far to have prevented artistic considerations from even entering into the technical task.
b) Surroundings

It is the surroundings that make of the open, uncovered space a square. As long as the surroundings consist merely of a line on the plan, a fence, a hedge, that is, as long as they do not possess the character of an architectural wall, the square lacks the corporeal, architectural quality.

Thus, also from an artistic point of view, the street crossings, expansions and connections discussed in chapter 5, do not belong among the city squares and the “traffic centers“, described under a in chapter 6, which must necessarily be open on many sides to provide thoroughfares for traffic, bear the architectural character of a square only as an exception when, in spite of the traffic that crosses them, the surroundings are kept as closed as possible. This is the case in fig. 363, 366, and 368 where station walls form the long side, in fig. 375 and particularly in fig. 364 where arcades embrace the open area, and finally in fig. 367 where the space is enclosed by the gate and buildings on one long side and by the ramp structures at the ends. In general the traffic center, open on many sides and crossed in all directions by streams of traffic and pedestrians, is artistically unsatisfying and has something this disquieting and uncomfortable about it; the warning against a too liberal use of the spaces - which may be the cause of modern disease “fear of open spaces” - particularly of radial spaces, may therefore be repeated.

The surroundings of squares cannot of course be entirely closed as streets opening into the latter are indispensable. We saw however in figs. 364, 367,395 and 470 how colonnades can be continued across the street openings or how a city gate may form the connection. The streets may also enter the square in such a way that the setting appears as a little cut up as possible, the gaze being directed more towards the buildings than towards the gaps made by the streets (fig. 376 and 380).

Colonnades either lie along the front of the houses, that is are built into the lower stories and continued across the street openings by arches, or they may be independent structures the purpose of which is to give the square an ornamental setting. In both cases they usually serve as covered sidewalks. The most magnificent example of the second sort is seen in fig. 423, St. Peter’s Square in Rome.

Gates and gateways also either form a part of the houses that surround the square, as in the Joseph-Platz in Vienna, the Kerkboog in Nymwegen, the thoroughfares for vehicles and pedestrians under the town halls of the Middle Ages and the Renaissance. (Munich, Lübeck, Emden etc.), also in the Piazza Grande in Triest (fig. 469) and the Place Des Vosges in Paris (see where mentioned elsewhere,) or they are independent structures: triumphal arches, city gates etc.
Examples of the latter are seen in the Stanislaus Square in Nancy (fig. 440), the Amalieborg Square in Copenhagen (fig. 443), the Karls-Platz and Königsplatz in Munich (figs. 392 and 444) and the Pariserplatz in Berlin (fig. 465). Surroundings of a peculiar sort are the wrought iron railings at the corners and across the street opening of the Stanislaus Square, the parapet railings in the Place de la Concorde in Paris (fig. 451), the parapets at the ends and the terrace along the side of Trafalgar Square in London (fig. 456). The destruction of many medieval town gates was an error not only from the standpoint of preservation of historic relics but also because gaps were thus formed at points where closed surroundings were needed to frame the street view, or squares either already in existence or yet to be laid out.

If the lines of the streets are continued across or along the length of a square it loses a great deal of its effect. This is not so when the views from the streets as they enter the square are of the opposite wall, so that the square appears closed. The simplest arrangement of this sort is that of the turbine or windmill squares discussed under heading 185 (fig. 476). Various applications of this design are shown in fig. 477, from Ravenna, fig. 478 from Mantua, fig. 479, from the suburbs of Brünn, fig. 480 from the plan for city expansion in Marienburg. Somewhat similar is the way in which lines of the streets face the walls of the squares in
An odd method of making the gaps in the surroundings of the square as small as possible is that employed, as has already been mentioned (marginal heading 202), in a great number of those towns that were founded in the thirteenth and fourteenth centuries, as German settlements in the countries lying to the east, for instance, in Pilsen, Waldenburg in Silesia, Glogau and Posen.

This method, as shown again in fig. 484 consists in combining two streets at the corner where they enter the square in such a way that the opening is only about half their breadth. Thus the corner houses a and b are visible in the street lines A and B, and the wall of the square a c gains in length. As the narrowed street areas that thus arose might be inconvenient for traffic and as medieval town builders can scarcely have made aesthetic considerations of first importance in laying out new streets and squares, we may suppose that the object of this arrangement was to gain longer fronts facing the square, for business purposes. Be that as it may, the plan, for artistic reasons, is worthy of imitation where the traffic allows of it. Under certain conditions it is admissible in order to relieve traffic to slant off the lower stories of the houses at the corners a and b, the upper stores being built out as usual. The arrangement shown in fig. 485 which consists in building the corners a , a back far enough so that, although the gap continues to be partly concealed, the traffic gains a sufficiently wide entrance into the square, may also be used. More modern examples are given in figs. 486 to 488, taken from Posen and Gelsenkirchen.

The buildings surrounding squares should present a harmonious appearance which is often obtained by uniform are symmetrical arrangement (Amalieborg Square, Place Vendôme, St. Mark’s Square, the Capitol Square, etc.); it can however be produced as well by providing for artistic balance in the placing of different single buildings as is shown in many of the picturesque medieval market-places (Lübeck, Bremen, Stralsund, Breslau, Krakow, Brussels, Veurne,
Brügge etc.). Generally the surroundings of the square consist of the town hall, a court house or a church, as the principal edifice, which the other buildings adjoin thus forming a graceful setting for the whole. The erection of two main buildings of different styles, standing opposite of each other, on the principle sides of the square, is also not difficult to carry out as they do not present themselves to the eye as a pair.

Far less pleasing on the other hand is the arrangement frequently seen in new city plans whereby two buildings are placed on either side of the principal axis of vision, for instance, or standing side-by-side form one wall of the square. The need for two such buildings of equal merit is rarely felt, as we stated under the marginal heading 224; it certainly should not be artificially created in the city plan.

The well-considered artistic setting of open spaces is indispensable if, in spite of the changes in the conditions of society and travel, modern city squares are again to reach the artistic height of the antique forum and medieval marketplace or to equal the creations of the Renaissance. In the setting the idea of the square is traced back to its source; it emphasizes the relation between the atrium of the antique house and the forum of the antique city, between the courtyard of the medieval or Renaissance castle and the city square of today. The clearer this relation is shown the greater will be the artistic effect.

C) Shape and Size.

If there is to be the suggestion of the room about the city square, as the foregoing sentence implies, its outline must be such that the whole appears as a unified space enclosed by the walls of the buildings about it. Broken outlines like those, for instance, of the Luisenplatz in Darmstadt (fig. 449) and of the square-like expansions in the Karl Friedrich Strasse in Karlsruhe (see illustration in part five, chapter 7, under a), with many jutting out corners, destroy the room like
impression. As the building line of a street so too it is desirable to have the outline of a square concave and to avoid making it convex; this does not mean that the designer should make all the lines of a square more or less circular but rather that he should bear in mind the manner in which a photographer groups a large party so as to get a good photograph of the whole. He arranges most of the people in an irregular concave line and places only a few, perhaps the most important members of the group, somewhat more towards the front. This consideration underlies the successful effect of squares like the Leipziger Platz in Berlin, the Place Vendôme in Paris, the colonnades in front of St. Peter’s in Rome etc. Indeed even many traffic centers that are open on all sides make an excellent impression because of the concave grouping of the buildings surrounding them.

Regularity of form, in the geometrical sense, is not necessary for a square; neither does it need to be symmetrical. Aesthetic balance however is required and distortions and “freaks” are to be avoided. The irregular forms of medieval squares, which only seem to be intentional and have really arisen in
the course of centuries for special reasons, charming though they are, cannot be imitated intentionally. But in modern suburbs and plans for city expansion irregularity is justified wherever it grows out of local causes and fulfills artistic purposes. We cannot call down on the squares we create the picturesqueness of former times; in a few years or decades the squares that we lay out will be surrounded by the dwellings and buildings of modern people. Thence follows for us the authority, not of the ruler and compass, but of the creative mind that uses the ruler and compasses as well as the freehand line to obtain artistic and practical results without losing itself among intentional irregularities for which there is no reason.

In spite of the radical difference between modern and former times we learn from the lawlessness of old squares that after we have planned the whole in harmony with the ideas of our time we should not allow ourselves to be too closely bound to regularity and symmetry in the execution of details. The beautiful form of the Piazza delle Erbe in Verona (see illustration in part 5, chapter 7, under A.), is very striking although the lines of both sides are not exactly symmetrical nor the details perfectly regular. By the use of such irregularities, recesses and projections, even spaces of an unfavorable form, as, for instance, the triangles that are so common in modern city plans, may be made nearable, or even picturesque, whereas in a regular triangle the lines of the buildings clash harshly and unpleasantly against one another.

The size and open space should be in accordance with the purpose to which it is to be put and with the size of the buildings that are to be erected on or behind it. The amount of business transacted on the marketplace, the amount of traffic, the desirability of garden
areas and other practical considerations will determine the size of the open space; but artistic considerations will prevent extremely large or extremely small dimensions and end will establish the limit of permissible measurements. H. Maertens’ excellent work: “‘the Optical Scale etc.’ (Der optische Masstab etc. 2nd ed Berlin, 1884) and the comparative study of well-known city squares afford us the necessary data.19

Maerten’s theories, which so far have remained undisputed all their essential points, include the following:

1) a distance equal to the determinative height of the building, requiring that the eyes be raised at an angle of about 45°, is the most suitable from which to obtain a view of the details of a building.
2) a distance equal to double the height of the building (requiring that the eyes be raised 27°) is the normal one from which to obtain a view of the whole building alone, while.
3) a distance equal to three times the height of the building (requiring that the eyes be raised about 18°) unites the view of the building with its surroundings and blurs the details; finally
4) a distance equal to 4 or 5 times the height of the building affords only a picturesque view of the whole, in which the outline of the building is most effective.

In judging the “determinative height” towers and such like, also high roofs etc. are usually not included. The greatest side angle at which a distinct view is still obtainable is about 70°.

According to these rules the breadth of a street or square, on or behind which a prominent building is to be erected, should be at least equal to the height of the latter.

If this be so it appears that many building regulations allow the houses to be built somewhat too high (compare marginal heading 120). On the other hand our warning against too broad streets (see marginal headings 114 and 123) is also justified. Thus too it seems that a number of medieval church squares are too small whereas many modern squares are exaggerated in size. For it is clear from Maerten’s rules that a square which is greater than double or three times the height of the building detracts from the view and effect of the structure. At certain points of the square however the distance may be greater, up to about 4 times the height, so as to afford a view of the picturesque, architectural union of the edifice and its surroundings. Then can also be no objection to streets which from a greater distance guide the eye to the edifice as the termination of the view. But also in such street views moderation must be observed for if the distance

19 compare also: Maertens, H. Optical measure for city-building, Bonn 1890
from which the building is seen is greater than 6 times its height is apt to appear insignificant unless a direct comparison with smaller buildings is afforded.

According to *Maertens* the old Procurazia is seen from the center of St. Mark’s Square by raising the eyes on the 29°, the new one and St. Mark’s Church by raising them 33° and 28°, while measured from the long side of the square the two first are seen at angles of 16° and 18°. The average breadth of the square is about three times the height of the buildings.

Our remarks on the least permissible size of spaces in front of public buildings (marginal heading 216) are supported by *Maerten’s* principles. The height of the courthouse on the Appellhofplatz in Cologne is about 30 m, the breadth of the square only 32 so that it is necessary to go down the slope into the Komödienstrasse to obtain a good view of the whole building. On the Piazza della Colonna in Rome, on the contrary, the palace facing the Corso is seen from that thoroughfare at a distance of 2½ to 3 times its height and the Marcus Aurelius Column, which is 29 m high, from a distance of about 40 m.

The depth of the square in front of Milan Cathedral is 169 meters, the height of the church is 56, thus the proportion is about 3:1. The effect of the whole is also marred by the fact that the facade of the cathedral does not sufficiently exceed in height the lofty buildings that surround the square; it has however been somewhat improved by gardens and a monument. The cathedral in Palermo, on the contrary, is seen from the side of the square at a distance of somewhat less than double its height; the effect is therefore much grander. The first view of St. Peter’s from the Piazza Rusticucci is not as impressive as we might expect; this is because, although the dome may rise 143 meters above the point from which it is seen, the distance from the visitor to the vestibule is 340 meters, that is 2½ times the height, and to the intersection of the nave and transepts 480 meters, nearly 3½ times the height. For this reason the view of the cathedral is rather a picturesque than a majestic one; it appears as a part of a magnificent architectural scene.

The beautiful proportion of about 1:2 or 2½ between the breadth of the square and the height of the building is shown, for instance, in the Capitol Square in Rome, the Piazza dell’ Annunziata in Florence and the market place in Brussels. The proportion of the breadth of the Kaiserplatz in Strassburg to the new Kaiserpalast is greater than 1:4; it is therefore not to be wondered at that from most points of view the palace does not make the desired impression. The proportion on the Königsplatz and Friedrichs-Platz in Kassel, on the Rathausplatz in Vienna and on the Szchenyi-Platz in Szegedin increases to 1:8 and more. On the Rathausplatz in Cologne, as well as on the sides of the minsters in Regenburg and Strassburg (North front), on the contrary, it sinks below 1:1.

Turning again from the size of the squares to their form it is clear, after the foregoing, that fronts with towers and domed structures require spaces of a form that will allow of a proper view of the high parts of the building; the spaces
must possess great “depth” (compare figs. 417, 419, 478, and 489.) Sitte designates this kind of squares as “deep squares”. Wide buildings whose height is not so marked, like town halls, museums, also the sides of churches, on the other hand, require long spaces of slight depth, called “broad” or “side” squares (compare figs. 366, 368 and 481, 490). The outline of St. Mark’s Square in Venice takes into account the cupolas of the church as well as the low wide forms of the Procurazie.

It would be toil spent in vain to try to establish artistic rules for the proportion between the length and the breadth of a square. Spaces that approach the perfect square in form, like figs. 434 to 437, 440, 442 etc., may in reality be as satisfactory aesthetically as long spaces, for example, figs. 381 and 389. The main point to be considered is the perspective view and that is dependent on where the visitor stands, on the buildings around and on the manner in which the space is ornamented. It is true, the longer a “square” is the more it looks like a street, perhaps the proportions of the Piazza Navona in Rome (1:4) may therefore be considered the limit between squares and streets. The so-called Friedrich Wilhelms-Platz in Aachen (proportion 1:6) and the Ständeplatz in Kassel (1:7) really do appear like streets.

The endeavor to enlarge too narrow spaces, to clear a space around monumental buildings that are too shut in, is praiseworthy in itself but is attended by risks. The fact that errors have been made on the side of exaggeration has called forth warnings against extending squares and against “clearings” altogether. Efforts have even been made to reduce the size of too extensive open spaces. Sitte, in his various works, has presented plans for reducing the open spaces about the court buildings, the Imperial Theatre, the City Hall and the Votive Church in Vienna by adding new groups of buildings. Even though from the standpoint of traffic these plans are partly impracticable and also arouse certain aesthetic misgivings, still they
contain artistic truths that have already been of great service in the development of city building. In fig. 491 we give a sketch, that is well worth consideration, of the alterations proposed by Sitte for the surroundings of the Votive church in Vienna.

The extensive space between the Ringstrasse and the church and the smaller space behind the choir should be partly built up with the blocks A, B, and C. A deep square of limited extent would still remain as an atrium in front and a space from which to obtain a side view on the Währingerstrasse. The choir and transept could still be viewed obliquely from the space remaining behind the choir. The ends of the block fronting on the Ringstrasse would be ornamented with two monumental fountains and an appropriate site for a monument "of the first rank" would be gained at D, which would be well set off by the closed architectural background.

d) Position of Prominent Buildings on or Facing Open Spaces.

The view according to which, in the preceding chapter, spaces in front of buildings, spaces surrounded by buildings and covered spaces were distinguished from one another, may also be expressed, if we make the buildings and not the spaces out starting-point, by distinguishing between a building (or buildings) that is detached on one, on
Buildings that are detached on one side only, have more the appearance of a front, a wall, than of an architectural body. Numerous examples were given in the foregoing chapter in connection with spaces in front of buildings and those surrounded by buildings as well as under b in the present chapter. The Greek agora and the Roman forum also generally show us only the fronts of the buildings. It must be admitted that this arrangement is less satisfactory for the building itself; but the spaces in front of such buildings and to an even greater extent those that are surrounded by majestic structures, may be so magnificently and effectively developed that it is not rare for the square to appear to be the main object and the buildings only a part of it.

Buildings detached on two adjoining sides, that is one end and one side, are comparatively rare. Such an arrangement often has a forced appearance in a regularly built city as one corner of the building projects into the square (see fig. 449). In other cases, for instance, in Catania, (fig. 492) the effect is excellent because the square is divided into two independent parts each of which is suited to the side of the building facing it. The imitation of such picturesque arrangements is by no means out of the question. Similar ones are found in the Cathedral Square in Sienna, in connection with Notre Dame in Rouen and several churches in Cologne, as well as in Würzburg where the choir of the Cathedral is on the Paradeplatz, the long north side on the Münsterplatz which is connected with it.

A different arrangement is when the building is so placed that the front and the back, or better, two parallel sides are free. This results in the formation of two separate open spaces, like those about the Palace in Berlin, the Cologne City Hall and many medieval churches.

But even in the Middle Ages prominent buildings were usually given a more isolated position. Three sides were generally left free and the fourth adjoined structures belonging to the church, palace, or whatever the main edifices might be. Several of the numerous examples that have been preserved are shown in figs. 493 to 496. In Padua one side originally adjoined other buildings whereas those on the other side were added later and are by no means organic. The cathedrals in Regensburg and Münster i. W., the Church of the Apostles in Cologne etc. are also connected on one side – in Strassburg the choir side – with buildings belonging to them. The back of the City Hall on the Market in Wismar adjoins a group of buildings standing on another property. That churches today are usually built completely isolated from other buildings is partly due to the fact that their direct connection with schools, cloisters, etc. is no longer as necessary as formerly and partly to a custom that has been carried to extremes. This custom may safely be broken away from and indeed such a course is to be advised wherever for practical reasons and out of artistic considerations it appears desirable (compare f.i. fig. 481). The proposals of Sitte and others however, who
set themselves against the isolation of buildings altogether, overshot the mark.

Ancient and modern churches and other edifices that are isolated on all sides have already been illustrated in great number in figs. 424 to 433. Other examples, such as very frequent in medieval towns, are given in figs. 497, 498 and 505. It is in keeping with the artistic interior construction of some buildings that all sides of the exterior should also be visible; but one or two sides can just as well face a garden as a public square. As regards an isolated position the following buildings, besides churches, come under consideration: city halls, concert halls, parliament buildings, market halls, exhibition buildings, stock exchanges etc. On account of the danger from fire isolation is even more important for libraries, archives, museums and theaters. Barracks, higher schools, and hospitals should indeed be in independent blocks and separated from all other structures but they do not require public open spaces about them as they should be provided with grounds of their own for recreation and other purposes as well as for outbuildings.

A building that is detached on all sides need not therefore need not stand in the center of the open space; figs. 417, 422, 424, 432, 439, 466, 498, 499 and 505 show the contrary. The principle view and perhaps also a second one has naturally to be considered and both these require a certain amount of space. Thus figs. 498 and 499 show a larger space in front and sufficient to afford a view of the choir at the side.
The division of the space about buildings of greater extent results in the formation of several (two, three or four) squares on the different sides of the building. Thus, for instance, the Domhof lies on the south side of Cologne Cathedral, the Domkloster on the west side and the Bahnhofplatz on the north side—all open spaces of considerable size. The choir side of Santa Maria Maggiore in Rome lies on the Piazza dell’Esquilino, the front on the Piazza Santa Maria Maggiore. Smaller buildings too are sometimes surrounded by different squares, among others the theatre in Mainz (fig. 500), three sides of which face three independent squares; Gutenberg-Platz, Tritonplatz and the Krempelmarkt; also the Mairie in the twentieth district of Paris, on one side of which lies the Places des Pyrenées, the junction of six streets, while the other faces the Square Tenon (fig. 501). The Church of St. Augustin in Paris (fig. 432), the Cathedral in Palermo (fig. 490), Sitte’s proposed alterations of the surroundings of the Votive Church in Vienna (fig. 491), the cathedrals in Amiens and Orleans and many other edifices show similar arrangements. A particularly charming group of squares is found about the Cathedral in Salzburg (fig. 502), consisting of Residenzplatz, the Kapitelplatz and the Domplatz which are separated from one another by open pillared passages.

It is clear that by means of such a distribution of the open space the single parts of which are treated as separate squares, the surroundings of an edifice may be made very rich in variety and picturesque, and the effect of the building itself also greatly enhanced. The surroundings of
Salzburg Cathedral, in which the Mozart-Platz should also be included, might be cited as a perfect example – as the individual squares are closely framed as far as possible and ornamented with fountains and monuments – if the Domplatz were not a little small and the buildings on one side of the Kapitelplatz did not stand quite so near the choir.

The opposite method, that is, the division of an open space by the erection of several large buildings is more difficult and not so frequent. Among examples belonging to former times we have already mentioned the Acropolis in Athens and the Cathedral square in Pisa; more modern examples are the Theaterplatz in Dresden and the Gendarmenmarkt in Berlin (fig. 433). In such cases the difficulties of determining the dimensions and “framing” the square are materially increased; their solution is a peculiar and risky task in each separate case, a task that, on the whole, has been very successfully accomplished in the examples mentioned above.

e) Groups of Squares

We have hitherto considered the division and grouping of a space surrounding one building (or in exceptional cases a group of buildings). The next step is to examine those groups of different squares that have no common artistic relation to any one particular edifice.

One sort of such squares was discussed in the preceding chapter (under e): double squares which owe their origin to the different practical demands that the square is intended to satisfy.
Another way of grouping different squares is according to artistic considerations with reference to different buildings. The Piazzetta and St. Mark's Square in Venice are not distinguishable from each other by differences in their usefulness but are widely distinct in their artistic arrangement. They are clearly divided from each other by the Campanile; the Piazzetta serves as a “front” square before the library and the palace of the Doges, St. Mark's Square as a space from which to view the church and as a majestic public square; their union results in a most beautiful city scene. Smaller, but equally characteristic is the group consisting of the Piazza di San Domenico and Piazza Reale in Modena (fig. 504), one of which is the square in front of the church of the same name while the other lies in front of the massive Palazzo Ducale or Reale. The group shown in fig. 503, in Parma, is similar. There too a church and a palace have caused the formation of a double square. One of the finest examples in Germany is a group in Braunschweig, of which only a sketch is given in fig. 505; consisting of the Alstadtmarkt with it’s fountain, surrounded by the city hall, the Martini Church and the Gewandhaus; and a second square that lies at the side of the church. Similar examples are found in Bremen, Lübeck, Stettin, Magdeburg, Cologne and other German cities; under the marginal heading 231 attentions was also called to the favorite grouping of the town hall and the church in the Middle
Ages, of which the market-place and the Marienkirche in Rostock (fig. 506) are an excellent example. French groups of squares are those about the Hôtel-de-Ville and St. Gervais in Paris, the Cathedral and the Court House in Reims, the City Hall and the Cathedral in Orleans. These attractive arrangements of squares and the picturesque scenes and groups which they produce show us how the close and careful grouping of open spaces in modern city plans too may contribute to the artistic embellishment of the city if the arrangement is based on a genuine need, is well thought out and properly executed. Examples of modern groups in Kiel and Marienberg are shown in figs 507 and 508. Arbitrary inventions for which there is no real basis are, of course, of little value; here too then it is clear that the city plan must not be regarded merely as an arrangement for traffic and buildings, but that the needs and aims of the future must first be carefully studied and the plan then adapted to them with due respect to artistic considerations.

The well thought out city plan should also aim to group the public squares artistically in the wider sense. Aristotle advocated that all public buildings should be grouped together in the city and this may well be demanded today in our smaller towns and newly founded cities. With the growth of the city however the prominent buildings naturally become scattered and it is one of the most important tasks in making plans for city expansion to arrange their distribution not only from a practical point of view but also artisticall, grouping public buildings and public squares so that they best fulfill the purposes for which they were designed and at the same time stand in artistic relation to one another. In this way arises the richness of design, the pleasing variety that we admire not only in the old cities where art has been especially cultivated (for instance Rome, Florence, Nürnberg, Braunschweig), but in thoroughly modern cities like Paris and Brussels. Groups like the Madeleine and Palais Bourbon, the Tuileries and the Triumphal Arch, the Palais Luxembourg and the Observatory; squares distributed as are the Place de
la Concord, Rond-Point and Place de l'Etoile, the Place d'Eylan, the Jena and Trocadéro Squares; distant and indirect views like those from the Boulevards of the churches Trinité, Loretto and St. Vincent de Paul – such artistic grouping in the same wider sense, which was also the aim of the author in his plans for the expansion of Cologne, offers not only an attractive scene on paper but is in reality most inspiring and, in the best sense, entertaining. The difference between city laid out in this way and one that is merely an unattractive rectangular system of network streets, entirely lacking the artistic wielding together of thoroughfares, structures and squares, is very striking and must make clear to everyone to how great an extent the building of a city may claim to be a work of art.

**f) Equipment, Arrangement and Level of Open Spaces**

Under marginal heading 226 the streets of a city were likened to the passages, the squares to the rooms of a dwelling. This comparison map be followed still further in the equipment of the streets and squares. Just as the decoration of corridors is kept subordinate, occurring only where they widen or contain alcoves or niches etc. so too streets are embellished only at such points. The square however as a bare space space is nothing but an empty room, a room without furniture or ornament. The candelabra, placard-pillars, newspaper kiosks and such like may be compared to the household furniture, the fountains, ornamental flagstaffs, statues etc. to the art objects in a house; plants and flowers increase the atmosphere of
comfort both within and without. Thus the equipment of the square must be added to its surroundings. In parts 5 & 6 of this half-volume the different objects used to adorn a square and their arrangement will be discussed in detail; at this point only a few general principals are emphasized.

The way in which such furnishings as lamppost, notice-boards, booths, railings, curbstones etc. are used should be much more artistic than has hitherto been customery in most cities; for the effect of the interior architecture of public buildings on the taste and mind of the people is small compared with the effect of the “little architecture” – if it may be so called – of the streets and squares. The kind of works of art to be used and the manner in which they are placed should be the subject of most careful consideration. What a difference there is, in this respect, between the majority of our modern cities – not only our manufacturing and commercial centres – and the ancient cities of Greece and Rome! Today there is indeed a wealth of statuary and other works of art in the museums and the houses of the rich, but an emptiness of all art in the squares; in Greece and Rome we find agora and forum magnificently adorned with works of architecture and plastic art speaking in monumental eloquence to the living generation, of gods and heroes, of the great deeds of their ancestors and of love of their country! The
average citizen visits the museum several times a year or – even less frequently. He crosses and sees the public squares weekly or daily. The artistic fountains of mediaeval towns and the statuary so generally seen in Italy should serve as models in our provincial towns to a far greater extent, always of course with due consideration of modern demands.

Useful structures and works of art should not interfere with views and lines of traffic. Only a work of importance can form the chief adornment of a square or the terminal point of a long line of vision. The arrangement of monuments like an army in a long straight line, is seldom desirable; grouping and picturesque distribution is more attractive.

The division and arrangement of the square is of great importance. Throughfares, footpaths, resting-places, flower beds and shrubbery, places for fountains and monuments, for booths and notice boards, seats etc. must be carefully considered and separately arranged for, just as in a room, carpets and rugs, chairs and tables, corner seats and ornaments are not distributed haphazard nor yet according to ruler and compass. The principal thoroughfares may indeed be curved according to necessity but must be blocked. The spaces that are free from traffic – with the exception of the resting-places, discussed under heading 191 – should be arranged as connectedly as possible for they are the only parts that can be decorated and offer the only opportunity to stand still and observe. It is advisable to divide extensive areas lying beside the paths into plots and borders.
These may be inlaid with geometrical and architectural designs in different kinds of paving, for instance, flagging and mosaic work (compare part 5, chapter 4.). As examples may be mentioned the Capitol and St. Peter’s Squares in Rome, the Cathedral Square in Milan and the Amalieborg Square in Copenhagen.

The lines of the edges of the walks and the railings or hedges, of the streetcar tracks, foliage, etc. of a square should be practical and pleasing, regular, but not forced in appearance. Geometry, art and nature should be united in a harmonious whole. Architecture and shrubbery, monuments and foliage, the green of plants, and water – all these, each by its peculiar character heightening the impression of the others, are the best means of obtaining artistic effects in public squares.

Finally, the level of a square is of the utmost importance. To an even greater extent than in streets it is necessary to avoid convex, and incline to concave forms. If we classify squares as horizontal, that is, approximately horizontal, and sloping, we may say that the former are generally better suited to be surrounded by, or to surround, eminent buildings and for artistic decoration than the latter without however excluding the sloping squares altogether. It is the reverse of beautiful to see a square that is naturally horizontal raised in the centre to provide better drainage, so that it appears to the eye, which sees horizontal dimensions much foreshortened, like a mound or top of a tent. If in addition a lawn or ornamental space is laid out in the centre it affords almost no pleasure to the passerby at the side of the square; only people in the upper stories of the buildings surrounding it can see the beautiful design as it was planned.

Among the ancients, during the Middle Ages and Renaissance, the opposite process was frequently employed, that is, sinking the square in the centre, thus affording a more complete and beautiful view of its surface, as many remaining samples show. Noteworthy examples of ancient squares are the forums in Rome and Pompeji, of mediaeval squares the market-place in Fournes (fig.435) and the Römerberg (square in front of the Römer) in Frankfurt a. M., and of a later period, the Residenzplatz in Salzburg, Zwinger and Theaterplatz in Dresden,
Piazza del Popolo and St. Peter’s Square in Rome. We have already mentioned that the last-named square slopes downward towards the centre in fig. 423; many models of it however take no notice of this fact, as, for instance, that in the Crystal Palace in London. Particularly if the square is to be ornamented with lawns, flower beds or fountain basins it becomes almost necessary to sink the centre. In modern times, since the subterranean drainage of cities has become indispensable, there is no longer any difficulty in making the form of the surface concave.

Where festival squares (public meeting places etc.) are concerned it is of still greater importance, from an artistic point of view, to sink the whole surface of the square inside a “frame” of a higher level. In the last chapter we pointed out the advantage of being able to overlook such squares from the margin; a raised walk all round with steps leading down from it, colonnades and archways as surroundings, flat roofs above the colonnades from which to overlook the scene – such an arrangement of the whole would bring back to us a tinge of antique grandeur.

Sloping squares cannot be avoided where the city itself is built on a slope. Their formation and artistic treatment is indeed more difficult than those of horizontal squares; nevertheless they can be made charming spots in the city. A majestic building on the upper side of the square, or even a large monument with terraced foundations, is most effectively placed. One of the finest examples of the sort is the Trocadéro Palace in Paris, which, seen from Seine or the Champs de Mars, rises majestically behind an ascending square. The church of

Fig. 507

group of plazas from Stübben’s construction plan for Kiel
Santa Maria Maggiore in Rome may also be mentioned again in this connection. Its choir rests on a foundation of thirty steps on the upper edge of the sloping Piazza dell’Esquilino. Another example in Rome is the church Trinità de’Monti, the narrow space in front of which is reached by ascending 125 steps from the Piazza di Spagna (fig. 509).

The ascending sides of a sloping square are little adapted to the erection of prominent buildings, still less so the lower side, on which building, seen from the upper side, looks as if it had sunk into the ground. Statues and fountains, on the contrary, can often be advantageously placed on the lower side or on the sloping surface, the background being formed by foliage. This is only possible however if a horizontal effect cutting into the sloping surface be avoided. The “Herrenacker” in Schaffhausen shows how unfortunate the attempt is to interrupt the slope of a square with the horizontal basin of a fountain. In this particular case the discord of the lines is all the more striking because the basin is set in the centre of the square. The surface of the water cannot be seen except from the upper half of the square. If water was to be used at all for decoration just at this point a cascade would have been suitable, certainly not a fountain basin intended for horizontal square or garden area.

The slope of the square may be either straight, concave or convex. A slightly hollow slope affords the prettiest view, particularly if the square is decorated with shrubbery and flowers. A convex surface, that is, one in which the upper part of the space has a gentler slope than the lower part, or worse, where a flat space adjoins a ramp-like ascent, is ugly. The ground floors of the buildings standing along the upper margin of the square are hidden from below.
the ridge. In such cases there are indeed methods by which the bulge can be concealed (compare heading 141) but their application is difficult and expensive. Generally the result is accomplished by separating the planes of the square by a parapet, terraces, dense shrubbery and such like. It is better in new city plans to avoid such ridged squares. The spaces about some imposing buildings, for instance, even Cologne Cathedral, are unfortunately not free from this evil.

A sloping square may be rendered uncommonly charming by allowing the streets at the sides to ascend but, according to the concave principle, keeping the surface of the square proper horizontal or, better still, only slightly inclined, which arrangement results in its being enclosed on the sides and along the upper margin by a terraced or graded setting. If these steps, breast-walls and terraces are architecturally developed, perhaps also ornamented with figures, artistic squares of the first rank may be produced. Examples are Trafalgar Square in London with steps at the sides and terraces above, and the Petit Sablon Square in Brussels, the surroundings of which are graded and richly ornamented with figures. For squares in front of public buildings the following arrangement is particularly advisable: a garden-like foreground above which the building rises by means of steps and ramps; examples in Paris were given in figs. 422 and 473.
When the extension of a forti\textsubscript{f}ed town is suddenly undertaken or when an unwalled city grows rapidly beyond its original limits, this development has a most decided influence on the traffic, business and property values of the central city districts. Sometimes the centre of the city moves in such a way that unfavorable changes in the value of land are brought about but, as a rule, traffic increases, business is stimulated and land value rise. The activity in building at the edge of the city is reflected in its centre; capital that is made in the outlying districts is invested in the inner city. The impetus thus given to the life of the city was clearly shown when Magdeburg, Cologne and Antwerp were extended and the same result has been produced by the growth of unwalled cities like Berlin, Frankfurt a. M., Hannover, Kiel and many others. The old city grows young again; the augmented traffic, the increased needs of many kinds feel themselves hampered and limited on all sides. Medieval city plans are not equal to the requirements of increased traffic, nor, usually, to those of public sanitation. Traffic and hygiene, as we understand them, are modern terms, little known to the Middle Ages. It thus appears that the outward growth of the city generally involves inner changes. Some alterations in the old network of streets are unavoidable. For the sake of traffic and public health narrow streets have to be widened; deviations in the street directions that hamper the traffic have to be altered, the levels of some streets or whole parts of the city have to be improved on account of the traffic, the drainage and to escape high water; new radial and diagonal thoroughfares have to be laid out; different street directions have to be connected with one another; it is sometimes even necessary to tear down whole portions of the city that bid defiance to health or traffic and to replace them with others. All these measures however must not be taken with a view merely to satisfying the demands of the modern city; they must also aim at preserving the old, at keeping intact historic monuments in the wide sense of the word.

An alteration should be made only if it is actually needed. In old towns and cities of slow growth changes in the streets and squares should not be brought about by establishing generally new flush-lines. It is sufficient in each case when a new building is to be erected to require it to conform to a new or the old building line as may be necessary. From an artistic point of view such quiet places are to be counted fortunate; but the citizens are more benefitted by industrial progress. In view of the civic improvements which the latter has brought about, the congress for the preservation of monuments, held in Erfurt in 1903, formulated the following rules:

1) Old structures of artistic and historic significance, among which especially characteristic private houses are reckoned, should be indicated as such on the flush-line
plans.

This is intended to prevent unintentional damage. It puts clearly before the man who lays out the new flush-lines to task of protecting these points.

2) A new building line that runs either in front of or behind that of such old structures, is to be established only if unavoidable demands of traffic and health require it. At the same time the question must be considered whether and how neighboring buildings are to be adapted to the new flush-line. Special attention must be given in this connection to the building over of footpaths.

When new building conforming to the new building line are erected on either side of an old structure, the latter is placed in an unfavorable position, either in a hole, as it were, or jutting out into the street. If this is unavoidable it is sometimes possible to overcome the difficulty either by building a hall of approach, by cutting a hall through the front of the old building or, as a last resort, by taking down the old façade and putting it up again on the new building line. The carrying through of the footway under the old Town Hall in Oberlahnstein has been accomplished in a model manner.

(3) The level of a street at the point where some building of historic or artistic value stands should never be changed unless difficulties connected with traffic, high water, etc. cannot be solved in any other way. In such a case careful consideration must be given beforehand to the way in which the old structure can be adapted to the new level.

Much damage has been done by laying bare the foundation walls of old buildings as well as, especially, raising the street in front of them so that they look as if they had sunk into the ground. Sometimes it has been partly remedied by laying out a sunken court all around the structure (Holztor in Mainz, Berliner Tor in Wesel, Pariser Tor in Lille); this expedient is to be recommended in case of necessity (fig. 467), in Lille).

(4) New flush-lines are, as far as possible, to be so established that not only certain structures are protected but also so that the individual character of old streets is preserved. If it seems likely that this will be destroyed by the carrying out of straight flush and level lines their establishment should be given up. Curved streets and characteristic variations in the levels up. Curved streets and characteristic variations in the levels of old highways should be retained if possible when new flush-lines, intended to widen and improve the streets, are established.

In the plan of the streets in nearly all cities we are able to trace the irregularities of a former village ground-plan, or of the surroundings of a castle that have gradually grown into a town, or of an ecclesiastical settlement. In the centuries in which art flourished and towns reached their finest development, in the late Middle Ages and during the Renaissance, these irregularities were used as a basis and, by building and forming, tearing down and constructing, altering and developing, those beautiful and picturesque city, square and street scenes were produced, whose loss should ever be guarded against by the modern city builder. Some old curved streets are found in which the curves in the line of the street do not correspond to those in the building lines. We must not seek to improve these by straightening the line of the street and that of the houses, by filling out the side hollows and
cutting sway all the projections. Neither must we think ourselves obliged, for the sake of traffic to level all rises and raise all hollows in the ground. The demands of traffic must be satisfied as far as possible it is true; but traffic does not require any mathematically straight lines. It does absolutely require widened streets, where necessary, the graduation of ascents, and, above all things, it must be easily surveyed. This is most important, and traffic is more easily surveyed on a slightly curved street with a slight concave slope than on one which is perfectly straight and level. In the latter case the near objects conceal the more distant ones far more than when the street curves gradually so that the objects come into view one after another as the street is traveled, thus not only affording much greater variety in the scene but also bringing the traffic into sight in a way that makes it easier to survey (compare marginal heading 139). It is often absolutely necessary to widen a thoroughfare and to graduate ascents, but it is never essential to straighten the line of the street, its walls, or its level.

Fig. 510 shows an old street widened to 13m. The old houses 1, 7, 9, 11, 21, 4, 6, and 18 have been left unmolested and as far as possible the original outline has been retained. Where the street was wider than 13m it has been allowed to remain so.

Fig. 511 carries out somewhat the same idea; a width of not less than 12m has been obtained without sacrificing any valuable buildings. Fig. 512 shows the same street improperly straightened. It is wrong from three points of view. First because the old historic houses 3, 5, 23, 25, 12 and 14 are sacrificed; second, because the new buildings could not be set forward to the building line unless the opposite side of the street were torn down, and third, because the rectification is unnecessary.

The solution in Fig. 513 does indeed produce a slightly curved street that is easily surveyed; but it would only be admissible if the first step in the alteration were to tear down the houses 16 to 26 at the same time, and if the houses 3, 5, 14, 23 and 25 were not considered worth preserving.

As a rule it is inadmissible to replace a concave curve in the wall of a street with a straight building line because the beauty of the view is affected and the street is made narrower.

In widening old streets and lanes the following purely practical points have to be considered: the depth of the building lots, the probable time that will elapse before the buildings are renewed, the value of the properties for which indemnity will have to be paid and the proportions of altitude. If the building lots are much deeper on one side of the street than on the other it follows as a matter of course that it is better to widen the street on that side. If the lots are not deep on either side the street should not be widened to the same extent as otherwise, so that the yard area is not too much reduced; this applies especially if the street is widened not so much to meet the demands of traffic as to obtain light and air for the houses, for light and air in the yards is just as important as in the street. It is also preferable to cut into those properties first that are of less value on which the buildings will probably be replaced by new ones before long and to protect as far as possible properties of high value and new houses. On very uneven ground it is usually easier to widen the street on the valley side than on the side next the upward slope; steep streets that
branch off may make the problem more difficult and influence its solution.

Cases are comparatively rare in which projecting buildings are acquired by appropriation or purchase when it is proposed to widen the street. The usual method is to establish a new flush line to which buildings must conform in the near, but indefinite future, in the expectation that the old structures will soon be replaced with new ones. Thus in thriving cities many improvements have been brought about in the course of a few years whereas in quiet places it is useless and sometimes detrimental to draw flush-lines in advance, as has already been pointed out.

5) As far as possible the closed effect in the sides of old streets and squares is to be protected even when the traffic necessitates widening thoroughfares, improving their directions and cutting through new streets.

In observing this requirement much forethought is necessary and even then insurmountable difficulties are sometimes encountered. Traffic demands a clear view of the line of travel and of the surface on which it moves. The more rapid the travel the farther must this clear view extends; otherwise it is difficult to avoid collisions. On the other hand the observer with artistic appreciation requires the closed setting. Fine distant views are characteristic of modern cities, like Paris, with long streets and open traffic spaces; it would be foolish to deny the element of beauty in such city schemes. But the individuality and artistic charm of the old cities and parts of cities that we are discussing lie in the closed,
varying, intimate character of their streets and squares. To open them up for modern traffic without sacrificing their quaint individuality is a difficult problem, one, in fact, that cannot be wholly solved because the aims are at variance with one another. The most we can do is to compromise and our compromises may be especially attractive if artistic power dominates the practical task. Several examples may serve to make this clear.

Bringing a side street into a curved thoroughfare at a point where the side of the latter is concave may ruin the effect; a hole is formed (fig.514). By bringing the street in at a convex point this difficulty is avoided.

Along the course of an old street we often find points at which two other streets enter almost but not quite opposite each other so that the view from each entering street is of the closed side of the old street. It would be a mistake to require the increasing traffic to take the two turns round the corners, or worse, to believe that such a course is advantageous to traffic. For through traffic an offset is always a hindrance and sometimes, for instance for street railways, it is absolutely impracticable. A method that is frequently employed, in order to meet the demands of the traffic, is slanting off the two block corners (fig. 516); but this destroys the closed view form both streets. If instead, the crossing is widened, at the

Fig. 512
Incorrect straightening of an old street

Fig. 513
crooked flushline of an old lane, only admissible under conditions mentioned in the text above
point where it leads from one direction into the other, as shown in fig. 517, the traffic is aided without detracting from the street views.

An old city gate in the encircling city wall forms a picturesque terminal point of a street, but blocks the line of traffic. The latter can be aided by tearing down the gate; as a rule such treatment is barbaric. It is little better to tear down the wall on either side, so that the traffic can pass not only through the narrow gate but on both sides of it, for the gate thus loses a part of its character and the gaps on both sides detract from the street view. These considerations led to the solution shown in fig. 518, the Severins-Tor in Cologne.

The unpleasant effect is still more striking if the gate is built into a group of buildings and it is to be detached on both sides, as was at first intended with the Weisser Turm in Nürnberg, for example. There the solution illustrated in figs. 519 to 521 was finally decided on, according to which the gate tower was allowed to remain in the wall of the buildings while the adjoining buildings were reconstructed and provided with throughfares for foot and carriage traffic as was required.

The closed settings or “frames” of old squares suffer most when street openings are introduced into them. In Brussels the house “l’Etoile” adjoining the city hall was torn down in order to widen a narrow street that entered the market-place at that point; the gap thus produced in the beautiful surroundings of the famous square was so unbearable that the Burgomaster Buls had the house reconstructed with a thoroughfare through its lowest story. The street now bears his name (compare fig.383, in which unfortunately the reconstructed house is somewhat too small). In Rome a broad traffic street was planned from the new Court House to the Piazza Navona which would have made a most unsightly breach in the surroundings of that square (compare fig. 389). During a visit to Rome Buls succeeded in having the plan so changed that the new artery of traffic was distributed in the network of streets before it reached the Piazza Navona. When traffic requires that a new street be cut through it should not lead into a square but go round it: an old architectural square should not be turned into a traffic centre.

A street in Frankfurt a. M. that has been cut through with great care and artistic understanding is shown in fig. 522. The flush-lines of the new street, leading from the Wedelgasse to the Fahrgasse have been drawn with several curves and varying width so that all along a breadth of at least 18m has been obtained, the open space “Römerberg” has been closed as far as possible, the Domplatz extended towards the west and the curious old court “Im Rebstock” preserved. In order to secure appropriately artistic facades various measures have been taken, among others prize competitions have been advertised.

6)So-called “clearings” about a building, or rather the establishment of flush-lines preparatory to such clearings, are made either to meet traffic requirements or for aesthetic reasons. In either case special consideration must first be given to the question whether the whole view of the building will gain or lose by the proposed clearing. If the latter is to be feared and the proposed alteration is intended to relieve traffic, the latter should, as far as possible, be diverted into another channel. If the clearing is to be undertaken for aesthetic reasons it is clear that it should not be carried out if it will detract from the view; an effort should be made to improve the surroundings and the building in some other way
The distant effect of a building about which a clearing is to be made must not be impaired by opening up too long lines of vision. Under marginal heading 259 and 260 the question of the distance necessary from which to obtain a proper view of a building was fully discussed. An example of how it should not be done is seen in the clearing about the graceful town hall in Lowen towards which the Bahnhofstrasse, which runs straight for a kilometer or more, is directed.

The points from which to obtain a near view of a building must not be lost, nor the smaller buildings near it which enhance its effect and serve as a basis of comparison. Finally, the dimensions of the open space, as well as those of the surrounding buildings, (compare chapter 7, under c) must not exceed the scale of the main edifice.

These points must be especially observed when the clearing is made for artistic reasons. It may be, when a fine building is wedged in among, and partly concealed by, worthless or unsightly structures, that a clearing is necessary or desirable. But it may also be that the chief artistic and historic charm lies just in the intimate connection of the building with the quaint old houses about it: in such cases clearing is a mistake that has
hitherto not always been avoided.

In order to create space about the Peters-Kirche in Löwen it was first proposed to tear down the blocks 1, 2, 3, 4, and 5, but later the much superior treatment shown in fig.523 was adopted. The writer was in favor of the plan shown in fig. 524.

In Darmstadt the old Kirchstrasse was very narrow and the so-called Stadtkirche unpleasantly hemmed in by surrounding structures; the street was therefore widened and a clearing made but at the same time some new and suitable structures were put up thus preventing the creation of a bare looking waste space about the church (fig. 525).

We have so far been occupied with buildings, streets and city districts which, in spite of the modern demands of traffic and hygiene, were to be preserved as far as possible. But there are as well numerous old structures, narrow little streets and districts that, a menace to health and hindrance
to traffic, not only deserve no protection but should be torn down in order that they may be replaced by new streets and blocks with plenty of light and air and improved traffic conditions. If a new radial or diagonal street is to be cut through such a district, misgivings as to the destruction of old properties are out of place. And if it is decided to do away entirely with such building blocks, the new network of streets should be laid out in accordance with the same rules that apply to altogether new city districts. We shall return to this subject in part IV, chapter 3.
Fig. 521
Weisser Turm in Nürnberg after realised traffic correction
Fig. 522
street cut in Frankfurt a. M.
exposure of the Peters church in Löwen
proposal Vingerodt          proposal J. Stübben
Fig. 525
widening of the churchstreet and partly exposure of the citychurch in Darmstadt
Besides their industrial use two points of view are determinative in the treatment of the city water courses and basins of water, canals both useful and ornamental, navigable and unnavigable rivers, lakes and seashores; the possibility of using these bodies of water to beautify the city, and their protection against disfigurement and pollution by the industrial establishments of the city. Both points of view demand that all bodies of water shall, as far as possible, be kept visible and accessible, hence that they shall not be built over or around in the inside of the blocks and that construction directly beside or over the water shall be allowed only when it is necessary for industrial purposes.

As a matter of course the city frontage on the sea, on lakes and navigable rivers, must in general be kept free for traffic. Special parts of the waterfront however, especially on the harbor will have to be reserved for the harbor and commercial traffic and for warehouses, docks, etc. In all cases it is well to separate the waterfront shipping traffic from the ordinary city traffic (compare marginal headings 161 and 162) either by laying out two roadways side by side on the same level (Hamburg, Cologne, Zürich) or by making a double street consisting of a city highway above and a quay street on a lower level convenient to the wharves (Paris, Lyon, Budapest, Mainz).

If the street along the bank is not used for waterfront traffic, or if the body of water is not navigable, the shores or embankments offer excellent opportunities for promenades and garden areas such as are seen in Hamburg’s Alsterbecken, Breslau’s Ringstrasse, the Dreisamtrasse in Freiburg and the Rheinanlagen in Koblenz. In cities where a considerable portion of the waterfront has to be reserved for shipping it is doubly necessary to beautify those streets along the water that are open for general traffic and recreation. In cities on the seacoast (not only in seaside resorts) as well as in cities on rivers, the open streets along the strand are generally the pleasantest and the most popular walks. The attractive treatment of the Alster banks in Hamburg, where lawns and ornamental shrubbery lie between the water and the paths, is a model of its kind.

In the centre of the city parking along the banks has generally to be dispersed with; along the seashore it is seldom possible because of the tide. Florence and Pisa have their famous Lungarno; at great expense Rome has created its Lungo Tevere; Naples, Venice and Trieste each have a Riva. Marseilles has laid out an extensive drive along its rocky coast. In that city and in Trieste there are rocks or cliffs in place of the parking seen in Hamburg which border and support the roads and fling back the surf that dashes against them. For the sake of its trade Antwerp was obliged to build up the banks of the Schelde with wharves and sheds; but the city has laid out an open driveway over the roofs of the sheds to which
expensive approaches for vehicles and foot passengers ascend. London built the Victoria Embankment at an enormous cost. There, as in many other places, (Bremen, Berlin, Breslau, Cologne, Deutz, Mainz, Rome etc.) former generations had failed to recognize the value of the open river banks for driving and walking, for recreation and as a means of beautifying the city. Later generations in Mainz, Cologne and Düsseldorf succeeded in once more setting free and improving the river banks.

Happy the city whose early inhabitants kept the river banks free and rendered them attractive by laying out garden areas or even planted a whole park along part of the course of a river or brook thus making the latter the chief charm of the area. The Englische Garten in Munich, the Hofgarten in Düsseldorf, and Karls-Aue in Kassel and the Bois de Boulonge in Paris are examples of this foresight.

In planning the expansion of Düsseldorf, Kiel, Flensburg, Rostock etc. special attention was paid to this point. Brooks and ponds surrounded by streets and vegetation should be used in new districts as a permanent means of beautifying the city.

In many cities experience has shown that a watercourse lying in private property or directly bordering on human habitations, gradually changes from a clear stream into a dirty ditch (Paubach in Aschen, Berne in Essen, Pegnitz in Nürnberg, Birsig in Basel, Dyle in Löwen, Grüner Graben in Berlin etc.) In view of this fact the “Verbande Deutscher Architkten –und Ingenieurvereine” in 1878, adopted the following resolution:

“In designing city building plans streets and squares are to be so disposed that they embrace the brooks and other navigable watercourses that run through the territory. Only in exceptional cases, especially for industrial purposes, is it admissible to place a watercourse in the inside of the building blocks; when this is done proper provision must be made for inspection of the watercourses by public authorities.”

In streets of ordinary width watercourses must be arched over and be so equipped that they can be easily cleaned and inspected. If a stream is to be left uncovered wider streets

---

**Fig. 526.**

_Boulevard Richard Lenoir zu Paris._

*Fig. 526*  
Boulevard Richard Lenoir in Paris
are necessary which are “then especially suitable for promenades (compare figs. 241 & 263, also the building plan of Freiburg in fig. 587). A partly covered, partly open watercourse in a wide street is shown in fig. 526, the Boulevard Richard Lenoir in Paris; the St. Martins Canal has openings at intervals into the street above which are surrounded with grass and flower-beds.

When a watercourse runs through the inside of the blocks and has become filthy and polluted by refuse, etc. it must be either diverted from its course into the public street or a new street must be cut through the blocks along the brook or stream. This has been done in Brussels where the dirty Senne was cleaned and made into a double canal along which the well-known beautiful Boulevards Anspach and de la Senne were laid out; similar changes have been carried out in Vienna, Breslau, Aachen, Basel, Marseilles and other cities. As however such subsequent regulation of watercourses is often combined with difficulties as regards property rights, and great cost, it is better in planning city extensions to provide against the development of such unsanitary conditions.

Watercourses used for industrial purposes and millstreams cannot of course be kept free from buildings but they are always an evil in densely populated city districts and their use in such should be limited as far as possible. If water rights are held by industrial plants that cause the water to be polluted (tanneries, dyeing establishments, etc.) an effort should be made to buy out the rights or terminate the lease. Unauthorized use of the water for such purposes should be energetically repressed; new plants should depend on steam for their power and should be drained (after the waste water has been cleared) into the city sewers. Such watercourses used by industries as must remain in the city blocks should be subject to constant, rigid inspection.

The rule requiring that river banks and streams should, as far as possible, be kept out of private ownership, also applies in a greater degree to ornamental bodies of ware (ponds, bays, coves) on the borders of which public gardens or promenades should be laid out. Ornamental ponds many also, in exceptional cases, supply the place of public squares, as was seen in the Feuersee in Stuttgart. How difficult it is to keep such bodies of water clean if they are surrounded by private properties is exemplified in many old city ditches which, formerly used for boating and other pleasures, have gradually become evil-smelling pools. As an example the “Beutel” in Schwerin may be mentioned. On the other hand it cannot be denied that an easily accessible public basin of water with adequate protection may be one of the great beauties of the city if it is surrounded by private gardens and villas. Charming examples are found around the lakes in the Grunewald Colony near Berlin and about a little, almost land-locked bay of the Aussenalster in Uhlendorf near Hamburg. The Schlossteich in Königsberg i. Pr., surrounded by pleasant gardens, is also one of the ornaments of that city. In the above mentioned building plan of Freiburg a small lake was provided for to be bordered partly by public streets and walks, partly by the gardens of villa properties.

Just as ornamental ponds may take the place of public squares so too canals may be used as highways, that is, serve for city traffic and for building. The classic example of a water-city is Venice where the place of cabs and street railways is supplied by gondolas and
“tramway” boats. The Venetian canals, called Rii, generally lie directly in front of the houses and palaces; sometimes a narrow street runs along one, seldom along both sides. Somewhat similar are the “Fleete” in Hamburg, the “Delfte” and “Grachten” in Emden, Groningen, Amsterdam, Vlissingen and many other Dutch towns. The Hamburg Fleete usually lie in the rear of properties that front on the street; they are not used for passenger travel but for cargo boats that discharge their cargoes into the warehouses that border the Fleet. In Dutch cities, particularly in Amsterdam, the Crachten which are usually combined with streets, carry both passengers and goods although, in contrast to Venice where there are no cabs, a complete system of streets for vehicles exists.\(^{20}\)

\(^{20}\) See also: Wochenblatt für Architekten u. Ing. 1880, P. 366.
All means of transportation, particularly those that we group under the general name of “railways”, are of eminent importance in the development of cities, an importance that constantly increases with the growth of the city on the one side and with its industrial advance on the other. Travel is a stimulating factor in city life and well-being, not only long distance travel but ordinary urban and suburban traffic. The main railway lines take care of the traffic to distant points. Suburban traffic is served by local railways (which may at the same time be main lines) on tracks that are quite separate from the city streets, or by street railways. Traffic in the city itself is served both by street and city railways. Hence we must distinguish between three kinds of railways, main railways, local(city) railways and street railways, in their relation to the city plan and to city building.

a) Main Railways

In part I, chapters 2 and 3 brief mention was made of the relation between the city plan and the main railways that terminate in the city or pass through it. We are concerned here with the points to which special attention must be paid in the establishment and distribution of passenger and freight stations both in the interest of city development and urban traffic.

Under marginal heading 78 railway stations are included under outlying establishments and in larger cities under the establishments to be distributed in different parts of the city, that is, they are grouped with those structures that would naturally be placed on the edge of small and medium-sized towns but that in large cities are to be distributed in the central and outlying districts.

To the outlying establishments must be reckoned in the first place all shunting yards, car works etc. with which the inhabitants of the city have little to do. The farther these establishments are removed from the built-over part of the city the better it is for the city building-plan. If they are too near the city the building plan of the latter is always unfavorably affected owing to the fact that the railway yards are very extensive and seriously interfere with the crossing of streets etc.

This also applies in a limited degree only to freight stations, as too great a distance between the city and the freight station, to which of course there is a great deal of traffic, is not desirable. Express freight stations should be situated near the city, best of all, next to the passenger stations; stations for general freight may be somewhat farther away and stations where the freight is handled in carloads and large quantities may be still more distant, and, in fact, it is an advantage to the city building plan to have them so.
In order that the growth of the city should not be too much hampered by extensive railway yards, it is well, in large cities, to divide the freight stations into two kinds; the shunting yards, engine sheds, turn tables etc. in one group, the real freight stations in the narrow sense (freight sheds, platforms for loading and unloading etc.) in the other. Only the latter need to be near the city. The first group may be situated a little way out, where the trains can be made up, come in and go out, while the freight stations that are to be distributed as needed in the inner districts should be quite limited in size and be connected with the outlying yard by a branch line. Instructive examples of this method are seen in London and Berlin where small freight stations have been established at different points along the main lines. It may be assumed that the increased cost in such cases is more than made up for by the advantages to traffic and the lower cost of property and construction. While in the city or on its outskirts tracks must be elevated or put underground, outside the town yards may be laid out on the surface with ordinary grade crossings.

The establishment in the built-over portion of the city of large passenger stations, particularly terminal stations, which must be equipped with many switches and sidings, is connected with great disadvantages, for the railway as well as for the city. The railway is put to great expense in the purchase of property and the cost of construction and even then it is cramped and unable to develop freely as the need arises. The city suffers by having its traffic streets either interrupted or undermined with tunnels; in many places the railways stick like a wedge in the flesh of the city (for instance, Berlin), separating whole city districts from one another and necessitating widely circuitous routes. Nevertheless the railway administration, particularly if it has to compete with other transportation companies, as in England, or if as in Germany, the railway owner in the shape of the state is able to sacrifice large sums of money for the general welfare, will strive to bring passengers as near as possible to their destination, that is, to the heart of the city. This has led to the establishment of stations in the central districts either in the form of terminal stations, most convenient for passengers, but disadvantageous for the technical reasons mentioned above, or wayside (through) stations. The latter arrangement makes it doubly difficult for the railway to reach the centre of the city but requires much less station and yard space.

This effort of the railways to get into the heart of the city corresponds of course to the desire of the city population to have railway facilities leading in all directions, within a short distance. But for the railways as well as for the cities both the advantages and disadvantages of such centrally situated stations are so great that local conditions must be depended upon to turn the decision one way or the other. In the following cities for example the question was thus decided: Hannover (through stations), Dresden and Cologne (connected through and terminal stations) have centrally situated stations; Düsseldorf (through stations) and Frankfurt a. M. (terminal stations) have outlying stations.

What has been said of freight stations in regard to the making up of trains, engine and car sheds etc. applies even more strictly to passenger stations. In addition, these should be as limited in size as is feasible, the space in the interior should be used as economically as possible and they should be distributed in different districts of the city.

The state railway administration or a company owning several railway lines will
naturally endeavor, in its own interest and in that of through traffic, to make one point the changing place for the traffic of the different lines. This has led in Germany and to a lesser extent in England and France to the establishment of central, main or union stations in many large cities. This is not always as desirable in the interest of the cities as in that of the railways. Frequently it leads to congestion of the traffic in the district where the central station is situated and a corresponding lack of traffic in other districts. The larger a city becomes however the more impossible it is to concentrate all the different lines of travel in one large central station; the more necessary too it becomes, in the interest of the city as well as of the railways, to decentralize the stations so that instead of congested traffic at one point we have a more equal distribution in different districts. London, Paris, Berlin, Vienna, Budapest and Brussels offer examples of such distributed stations though in most of these cases the distribution is not the result of planning but of the system of private railway ownership. As a rule these different stations are terminals grouped around the centre of the city. London, Berlin and Vienna also show how the disadvantages of terminal stations – failure of the railways to reach the traffic centre of the city and lack of through traffic lines – may be overcome by the establishment of “city railways” (Stadtbahnen) which will be discussed under b.

The open tracks of the main railway lines still lie to a great extent on the same level as the streets which is the cause of any evils and much danger to the railway traffic and especially to the street traffic. Within the last few decades enormous sums have been spent and must continue to be spent in order to get rid of these evils. In the construction of new railways or the reconstruction of old, level(grade) crossings in cities are now always avoided. In hilly cities the crossings are made by means of viaducts and tunnels. In flat cities the railway has to be raised. The credit due to the railway administrations for their work in this direction in large cities does not unfortunately extend to their efforts in smaller and medium-sized town or in the suburbs of great traffic centres. In these suburbs too, which experience tells us grow rapidly, and in medium-sized cities which are developing with the advance of industry, the separation of the railway level from that of the street should be undertaken as speedily as possible, for delay only increases the ultimate cost; especially however new construction and reconstruction should not go on on the street level.

Separating the railway from the street level facilitates the penetration of the passenger traffic into the heart of the city and at the same time tends to keep the freight trains off the railway line that cuts through the city. In large cities it is usually cheaper and more practical to lead the freight traffic, in as far as it does not concern the city, round the latter outside, than to burden the tracks intended for passenger traffic in the city with freight trains or to lay special tracks for freight.

In existing city districts a new main railway line is seldom to be placed
on a dam or viaduct in the middle of the street; as a rule the railway line is to be laid across through the building blocks and to be carried over street crossings on bridges. Unfortunately this method produces many unsightly views. Foot passengers in the streets are confronted by bare house walls where the railway line cuts through and passengers in the trains look out on unattractive back yards and rear buildings receiving unpleasant impressions of metropolitan life and housing conditions before they even set foot in the magnificent streets of the great city. The Berlin city railway (Stadtbahn) affords a hideous yet by no means the worst example. These evils are unavoidable if the railway is carried through or into the city after the latter is built. It is possible however to relieve the ugly views somewhat if this side of the matter is borne in mind when the plan for the railway line is made. By purchasing remnants of blocks that are unfit for building on along the line and planting them with grass, shrubbery etc. and by proper treatment of the windows and house corners next the railway much improvement may be accomplished.

Also in new city building-plans which have been designed at the same time as the railway system, or when railway lines are laid out in districts for which the building plans have been made but not yet carried
out, tracks are often placed unnecessarily in the inside of the blocks. In such cases, it is true, property owners are able to build their houses with some regard for the position of the railway and to consider the view of their houses from the trains. Thus the worst errors can be avoided; in cities where the houses are built detached and in villa districts the view from the railway of the gardens may even be very attractive. But as a rule, even under such conditions, much ugliness is seen, for by no means all property owners consider the impression made on railway passengers. The backs of the city flat-houses seldom lose their ugliness and at the street crossings where the railway cuts through the rows of houses an unpleasant effect is always produced unless, as in England, the sunk or elevated railway is built over the houses or portals fronting on the street.

The reason why railways are run through city building blocks is usually because of financial considerations. If a street were laid out on either side of a railway dam or excavation the city would be responsible for two half streets as the abutters are only obliged to care for half the street, that is from their houses to the middle of the roadway, unless indeed it were possible to reckon each of the streets as a half street. Naturally the city seeks to avoid this expense. But not only cost should be considered. The beautiful appearance of the city for the citizen and for visitors is also worth some sacrifice. Thus though it would be going too far to require that all passenger lines should be laid out along the streets and in such a way that travelers would see the fronts of the houses, yet in planning railways in the city the effort should be made to combine the railway lines with those of the streets and
with gardens, bodies of water, etc. so that, in short, the ugly method of cutting through the blocks would be avoided.

We must guard still more carefully against a railway line that is bordered by a street along one side and by the backs of properties facing another street on the other. In such a case not only the view from the train is unpleasant but also that from the houses fronting on the street beside the railway track.

An example of a railway lying in an excavation between two streets was given in fig. 261. Viaducts may be built either with open construction so that city traffic may pass beneath them (see figs. 527 & 528 in Rotterdam) or the arches that support them may be used for shops, restaurants etc. (for instance in the Berlin Stadtbahn, and the Vienna Verbindungsbahn). Examples of railway lines in or along parks are found in Mannheim, Hamburg, Cologne, Berlin (Tiergarten), Paris (Buttes Chaumont); for travelers they are undoubtedly the most beautiful way of approaching a city by rail and if the country is at all undulating the lines can be combined with the park landscape in a perfectly acceptable manner. In other places the banks on either side of the track are planted with vegetation affording a pleasant view for the traveler as well as the passer-by in the street (Elberfeld, Amiens).

b) City Railways (Stadtbahnen)

The term “city railway” is used for several kinds of railways that are absolutely different from one another in purpose. The least important, for us, of these railways are the connecting or girdle lines that connect the outlying stations with one another in wide circular form; as a rule they are used principally for freight, transporting troops etc. and at present have little influence on the city building plan. In the more distant future they may be of importance for local and suburban traffic.

The second sort of city railway connects the outlying stations with one another by means of one or more diameter lines, thus carrying the traffic from outside (long distance traffic) into the centre of the city and at the same time facilitating through traffic. (Stadtbahn in Berlin and Vienna). If it is sufficiently long this kind of city railway may also serve city traffic though that is not its first purpose. The Berlin Stadtbahn gains its real importance as a means of local conveyance from the fact that besides the long distance traffic it has extra tracks that are connected with the “Ringbahn” which encircles the whole city, touching in its course the outlying districts and suburbs.

The third kind of city railway, the Stadtbahn proper, is intended to be used for city traffic over greater distances in the city thus affording rapid transit facilities between city districts that lie far apart (London underground, New York and Liverpool elevated, Paris Metropolitain railway, Berlin electric elevated and underground Railway, Budapest
Stadtbahn, suspension railway in Elberfeld-Barmen). The connection of this kind of railway with the outlying stations and long distance traffic is convenient but entirely of secondary importance. It should form an independent system or network adapted to the traffic needs of the city but separate from the street and long distance traffic. Electric trains of not too great length following each other at short intervals and stopping at stations from 0.70 to 1.00 km apart best serve the bulk of the traffic. Such a city railway is only necessary for thickly populated cities where the distances are great; smaller cities are adequately served by the main railways and the street railways.

If we compare our cities with those of England and America we must come to the conclusion that here on the Continent we are only at the beginning of the development of city railways; hence it behooves us in planning cities and transportation systems in large cities to prepare the way for future city railway traffic more than we have hitherto done. This is the more important as experience has shown that the traffic increases much faster than does the population of a city. In London in the ten years from 1864 to 1874 the population decreased 40%, during another period of twenty years it increased 64% whereas the amount of traffic on the city and street railways and omnibuses during these periods increased three and sixfold. In New York the population increased 59%, the traffic 262%, in twenty years. Also in smaller cities in which the population is reckoned not by millions but by hundreds of thousands some consideration should be given, in planning streets and city extensions, to the probable requirements of the city railway in the future; in some cases it is possible to arrange the outlying connections between the different stations and the mail lines that penetrate into the city in such a way that with the growth of the city in the future they may be used as city railways.

In planning a city railway one of the first questions to claim attention is whether it is to be underground or elevated, for such railways on the level of the streets yet entirely separate from them are quite exceptional. An underground railway may run in a double-track tunnel or in two single-track tunnels, either so deep that the city water, gas, sewerage systems etc, are not affected (London underground railway, and “tube” between Southwark and the City the latter consisting of two tubes 3.16 m in diameter) or directly under the surface of the street so that in or beside the tunnel the city conduits also find a suitable place. The former method, which presupposes a hilly territory, also allows of the railways being diverted from the course of the streets (as in the London underground) and of tunneling across the building blocks under the house cellars, or even under the bed of a river (as in the London “tube” between the City and Southwark). The latter method involves the use of the street system but this also keeps the railway in close connection with the existing lines of traffic and makes the stations more easily accessible. The elevated train is also pleasanter for passengers, lighter and airier, but it cannot be developed to the same width as the underground, and is more or less unsightly and noisy when seen from the streets, squares and upper stories of the houses which it passes. An elevated railway that forsakes

the streets and crosses over the roofs of the houses comes under consideration only as a very rare exception. In order to reduce the loss of light involved in a city elevated railway to a minimum and to make sharp curves possible, the Lartigue one-rail track was recommended. It consists of a single rail on forged iron trestles and two guide rails on the sides, without any ties or flooring.\textsuperscript{22} It has been superseded by the Langen suspension railway.

At present electricity is used almost exclusively. For city and street railways it is most practical to conduct the electricity, that is produced in one or several power house, to the cars and thus to set in motion the electric motors under the cars. The manner in which the electric current is conducted differs according to whether the track lies on a separate road, such as is necessary for city railways, or is laid on the ordinary street roadway, which will be discussed under street railways (see c.). The rails serve to return the current.

Cable railways may also serve for city railways. In this case the cars travel by taking hold with grippers of a never-ending cable that is moved by fixed machines. Especially in America this kind of railway is used.

Funicular railways on an inclined plane are used in Budapest to ascend to the Burg, in Lyon to the Croix-rousse, in Pittsburg to connect the lower part of the city with the districts on the higher level,\textsuperscript{23} also in Dresden, Turin, between Ouchy and Lausanne and in many other places. Water power is frequently used.

c) Street Railways

As we have seen, the main railways serve the outgoing traffic, the city railways the traffic between distant parts of the city and suburbs. Both these kinds of railways in consequence of the rapidity with which they travel and for other reasons cannot find a place on the city streets. The street railways are laid directly on the roadways of the city streets and serve the traffic over shorter distances where speed is not so much an object, both from one district to another, and from the city to the suburbs; they also serve to relieve and facilitate the ordinary street traffic. Street railways, according to the power used may be divided into, horse, electric, cable railways etc. and according to the width of the tracks, into normal and narrow gauge roads, but though the ascents and curves of such railways are affected by these factors, they have little influence on the way the railways are laid in the streets.

Where the street traffic is very dense, as in the central districts of Paris and London, street railways cannot be used, nor in a network of narrow and intricate streets like that of the inner city in Vienna. In such cases passengers must

\textsuperscript{22} see: Centralblatt der Bauverwaltung, 1889. S. 216

\textsuperscript{23} see: American Engineer, 1887, 10. April
depend on omnibuses, in traveling over prescribed routes, or on cabs, handomes and other such conveyances. It is true that on wide streets where the traffic is light street railways “regulate” such traffic, but this does not apply to streets that are already fully occupied with city traffic of all kinds. In such streets the presence of street cars that cannot turn out themselves and thus hamper all other vehicles in traveling and produce stoppages in standing still, by no means regulates and aids traffic but, on the contrary, is a decided hindrance. Hence the street railway system which had its rise in North America must stop short of the heart of all cities.

The second limitation in the use of street railways applies to their speed. On a busy street it must not be much faster than of a vehicle drawn by a trotting horse; in cities therefore it is usually about 180m a minute, while on country roads, under certain conditions also on wide city streets where there is little traffic, a speed of from 200 to 300m a minute, that is 12 to 18km an hour is considered admissible. Thus it follows that the need of rapid transit by means of city railways is felt in the inner city even for comparatively short distances whereas as regards traffic between the city and suburbs it is felt only when the distances are greater.

Nevertheless inside those limitations as regards dense traffic and low speed street railways have a wide sphere of usefulness that continues to develop daily. In the environs of Italian and Belgian cities steam street railways have been found
serviceable for distances up to 30km and more.

The perfecting of street railway systems goes hand in hand with their more extensive use and development. It includes the system and construction of the line as well as its management and working.

As the street railway is intended to carry a part of the street traffic, it is necessary that it should keep to the main lines of travel – radial, peripheral, and diagonal – or if the traffic on some of the main streets is too dense to allow of street cars running there, to follow lines that are as nearly as possible parallel. It is used only for travel in one district or between two districts where the distance is great enough (at least about 1.50 km) to outweigh in the passenger’s mind the time lost in waiting for the car or in walking to reach it and the money spent for fare. If the distances are too short the street railway does not pay.

As the main radial streets are the busiest lines of traffic it follow that they are the first directions chosen for the street railway lines; their importance grows with their length. Thus the busiest street car lines run from the suburbs into the city and the heart of the city, in some cases through it and out into a suburb on the opposite side. In some places these radial streets, on which the cars runs and which extend into the country, have been used as sites at greater intervals for new settlements of private houses, summer houses, or factories, which very gradually, as the land between them and
the city is built up, become a part of the latter.

In contrast to the radial system of street railways lines (fig. 529) stands the ring line (fig. 530 or 531) which either receives the radial lines or exists

Fig. 534.

*Strassenbahnnetz zu Mailand. — ca. 1/60000 w. Gr.*
independent of them. The latter sort of ring line is only of importance for large cities and for thickly populated cities of medium size with much traffic and at least 150 to 200 thousand inhabitants, for in smaller places the peripherical traffic is very slight. The Berlin Ringbahn is about 4, the Hamburg Rundbahn about 2, the Vienna and Cologne ring lines about 1 ¾ km in diameter; it would not be worthwhile to build a line round a much smaller circle because the distance from one point in the circle to another would not be great enough to warrant the circuitous route in the car. On the other hand a ring line that receives the radial line (fig. 530) – a necessity in a city where the inner districts do not admit of street railway lines – may be very desirable even in cities of fewer inhabitants and where the diameter of the circle is smaller. If the ring has double tracks the cars that come in from outside can easily turn into it, carry the passengers to their destination, and then either return or continue their way on another radial street. There is also no reason, if the ring is sufficiently large, why cars should not travel round it without turning out into the radial streets. A combination of through radial lines and others that are received into the ring line is shown in fig. 532. Of course in every case local traffic and street conditions are determinative in planning a street railway system, giving rise in some cases to very curious forms. The scheme of the Cologne street railway system is shown in fig. 533. It consists of a belt line, cross line, ring lines, a diametrical line from Marienburg to Ehrenfeld and several outside radial lines, and has recently been considerably extended. The street railway system in Milan (fig. 534) is composed of a considerable number of inner radial and side lines, of which the former centre at the cathedral square, a ring line and numerous outer radial lines of from 4 to 32 km in length.

For the intricate traffic conditions of very large cities the simple radial and ring lines do not suffice, as the two last named cities show; all kinds of diagonal lines have to be introduced. These are intended to make the shortest and most convenient connections between the central points and the points of gravity in the city traffic. The stations for the main and city railways, the markets, business streets, place of amusement, the harbors and landing places, stock exchanges, post offices, etc. are the natural central points of the street railway system in which the ring lines and the long suburban lines are indeed essential but by no means exclusively determinative factors. Rules cannot be formulated for the construction of such systems.

Where, as in America and Russia, the whole city is laid out on a rectangular scheme the natural traffic lines: radial, peripherical and diagonal, cannot be fully developed in the street railway system; the latter is rather limited to long and cross lines which involve roundabout ways and lose of time and power. In long narrow cities double cities and as a means of connection between two neighboring cities, the railway system of ten consists merely of one main line.

The most common method of treating the terminal points of single lines is to make a loop at the end of the track. In this way the turning about to start in the other direction, which requires both time and space, is avoided. In Paris the star and circular open spaces have proved especially suitable for such loops.

Whether a street railway is to be laid out with single or double tracks is first of all
a question of capital but to an even greater extent a question of management. A single track street railway is always very unwelcome, because the cars cannot pass each other except at a switch which greatly limits the time table and any mishap to a car, that may so easily occur in the street traffic, affects all the cars on the line. Consequently the line is not popular; it does not attract traffic and therefore cannot develop itself. Only for longer distances where the traffic is light, for instance, on lines running to more distant suburbs, is the single track railway serviceable. The distance between the switches depends on the speed of the cars and the intervals at which they follow one another. When the cars travel at an average speed of 180m a minute and follow one another in both directions at intervals of 10 and 5 minutes the distance between the switches is $1800/2 = 900$ and $900/2 = 450$m respectively. The shorter the intervals at which the cars follow one another the less is the amount of capital saved in the construction of a single track road because the sidings are of considerable length and the switches themselves cost more.

In old cities narrow streets and sharp corners often make a second track beside the first impossible; sometimes it is even necessary to tear down houses in order to lay a single track with switches. In such close quarters it is advisable, as soon as a second track becomes necessary, to divide the tracks, that is to lay the second one in another street as nearly parallel to the first as possible. In this way the advantage of double tracks is gained which consists in the independence of the cars from one another particularly from those running in the opposite direction (for example, Elberfeld, Hundsturmer Linie in Vienna, Querbahn in Cologne in fig. 533). Traffic on double tracks that are undivided however is clearer and passengers find them more convenient.

A single track stretch may sometimes, under certain conditions, be used like a double track one by making the distance between the switches so short that the driver or motorman is able to see from one switch to the next and thus to stop his car only when he sees another. Short stretches of single tracks are often necessary on an otherwise double track line. In order to avoid switches they may run round a loop.

Sharp curves in street railways are undesirable not only because of the increased demand they make on the power and the danger of the cars running off the track, but also because of the loss of time and the inconvenience suffered by other vehicles the wheels of which can easily cross the track at right angles or follow it in the long direction by begin to skid and slip as soon as they strike a slightly raised rail at an acute angle in passing over it. The least admissible semi-diameter of a curve depends on the distance of the wheels from one another and on the gauge, unless cars with wheels that can be turned are used. For this reason the wheels are placed as close together as possible (on small cars at a distance of from 1.40 to 1.60m from each other) and the front and rear platforms project as far as is compatible with safety. As a rule the street railway tracks have the same
gauge as the main railways, 1.435m, the cars are thus able to round curves of 20m semi-diameter with ease and with some difficulty those of 13m semi-diameter.

The ordinary street car should not be more than two meters wide, so that, allowing a space for safety on either side, it occupies at least 2.50m (better 3.00, m) of the street width; hence a double track street railway of ordinary gauge takes up form 5 to 6 meters of the street width. For every other larger vehicle a strip 2.5m wide has also to be reckoned. Thus for normal gauge street railways the following are the least admissible widths:

1) For a single track, allowing room for an ordinary vehicle to turn out: 5m. A vehicle may step at the curb only on the side of the street that is free from rails; there is not space for another vehicle to pass the car beside a vehicle standing at the curb. The edge of the sidewalk is 0.50m from the nearest rail (fig. 535).

2) Width required for a double-track street railway without space for other vehicles: 5m. As no side of the street is free from rails a vehicle can stop at the curb only in the interval between the passings of the cars. The occupants of the houses are thus such inconvenienced and, although the trucks regulate the movements of the traffic, hitches often occur (fig. 536).

3) Width for a double-track street railway with space for other vehicles on one side (fig. 537) or for a single track with space on both sides, 7.50m (fig. 538). In the former case the ordinary traffic is at a disadvantage as vehicles can stop only on one side of the street; in the latter case the street railway service is incomplete.

4) Width for a double track road with space on both sides: 10m (fig. 539).

5) Width for a double-track road with space on each side for vehicles to meet and pass each other: 15m (fig. 540).

6) Width for a double-track road with space in the middle of the street for two vehicles to meet and pass, and space for a single vehicle on either side: 15m (fig. 541).

Of these widths number 4 is the first that is really suitable for busy street and street railway traffic; with sidewalks 3m in width such a street would measure 16m across. To meet greater traffic demands this width may be increased to 18m (10m roadway, sidewalks each 4m); 20m (11 to 12m roadway, sidewalks each 4 to 4.50m) or 20m (11 to 12m roadway, sidewalks each 4 to 4.50m) or 22m (11 to 13m roadway, sidewalks each 4.50 to 5.50m).

The best position for the track or tracks is generally the middle of the roadway, for this interferes least with the drainage of the street and enables vehicles to stop at the sidewalks; the disadvantage of this arrangement is the
Eingeleitige Straßenbahn auf 3 m breitem Fahrdamm.

Zweigleitige Straßenbahn auf 5 m breitem Fahrdamm.

Zweigleitige Straßenbahn auf 7,5 m breitem Fahrdamm.

Eingeleitige Straßenbahn auf 7,5 m breitem Fahrdamm.

Zweigleitige Straßenbahn auf 10 m breitem Fahrdamm.

Fig. 483.

Zweigleitige Straßenbahn auf 15 m breitem Fahrdamm.

Fig. 484.

Zweigleitige Straßenbahn auf 15 m breitem Fahrdamm.

Fig. 485.

Straßenbahn an einer Mittelallee.

Fig. 486.

Straßenbahn am Park.

Fig. 487.

Zweigleitige Straßenbahn auf 18 m breitem Fahrdamm.
danger of passengers being run over or injured getting in or out of the cars. In narrow streets (see 1, 2 & 3 above) however this arrangement is not possible and even in wide streets it is better to place the tracks at the side of the roadway if it is not necessary for ordinary vehicles to stop at one of the footways, for instance, where there is a walk in the middle of the street, or along garden areas. Hence in figs. 542 and 543 the position of the tracks at the side, as indicated, is generally to be preferred, because ordinary street traffic is thus enabled to use the free side of the roadway with greater freedom and the danger of being run over does not exist on one side at least. Another symmetrical arrangement with the tracks at the sides is shown in fig. 544 (Hohenzollernring in Cologne). On the axis of the roadway, which is 18m wide, there is a row of candelabra, the middle strip of 8m in width serves for carriages and riders, while the side strips (5m wide) are each divided into a horse-car track and a space for general traffic, the latter next the footway. This treatment is very desirable for broad roadways; ordinary vehicles can stop at the curb and the danger of being run over is lessened, as rapid vehicles usually keep in the middle of the street.

Improvements have continually been made in the surface construction of street railways, usually in the direction of greater durability, perfecting of the joint-fastenings and closer connection with the pavement. From the standpoint of road maintenance cross sleepers and wooden long sleepers should not be used. Flat iron ties in the crevices of the pavement should hold the rails together. Iron or steel for the whole surface construction is becoming more and more general. The system most in use in Germany is the grooved “Phönixschiene”.

The ability to travel up steep ascents, the cost of working the line, the speed and capacity of the cars, are determined by the motor power. We find in use mainly, horse power, steam, compressed air and electricity.

Horses are no longer much used in larger and medium-sized cities. Even on ascents of 1:40 a car drawn by one horse is cruel; a pair of horses – with an extra one in front – can draw a car up an ascent of 1:15. But speed and our capacity are both always low.

Cars drawn by steam engines are not usually suitable in the central districts of a city both because the density of the street traffic does not admit of greater speed than that of a fast horse, and because in spite of smoke consuming and protective devices the engines cause much annoyance to the occupants of the houses they pass. Steam may however be used on an outer street where the traffic is light and the steam railway line long, because it insures greater speed and capacity and the noise and smoke are not so objectionable there. Its use to supplement horse power on occasions when the traffic is greater than usual (Sunday traffic) is also admissible.

Cable systems with underground cables are quite common in American and English cities, in the plains as well as in hilly countries (New York, Chicago, Philadelphia, San Francisco etc. also Birmingham and Edinburgh). The cable system is especially useful on steep ascents, on which other kinds of cars cannot be used (for instance Highgate Hill near London).

In place of steam compressed air or various gases may be used. But during recent decades electricity has triumphed over all other kinds of motor power.
The explanation of the construction and use of the electric street railway does not lie within the province of this book. It will suffice to point out the principal systems used: the overhead current, the underground current and the storage battery. Everywhere the rails, which are connected with each other by metal, serve to return the current to the place where it is produced. The longer the storage battery system has been tried the less economical it has proved. The subterranean current is far more expensive and less reliable than the overhead system; it is used wherever it is particularly important to avoid disfiguring the street with poles, wires etc. especially in the neighborhood of monumental buildings. But the system used everywhere with success is the overhead current. Whether it is cause for rejoining or not, practical advantages for the traffic have triumphed over considerations of beauty.