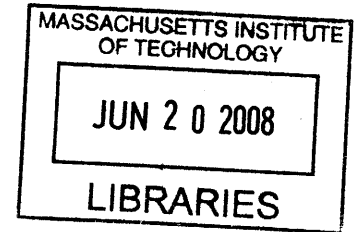


CERDA AND BARCELONA : RESEARCH AND PLAN

by
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Valeria Alonso Fernández

Submitted to the Department of Architecture

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in partial fulfillment of the requirements for the
Degree of Master of Science in Architecture Studies

ABSTRACT

The Industrial Revolution had a huge impact on nineteenth century cities and societies. Various European cities had plans to expand the "old city". Due to its historical controversy and symbolism, one of the most eminent plans developed during that time was the Eixample plan in Barcelona.

The Eixample plan is the result of a controversial competition won in 1859 by Idelfonso Cerdá, a man trained as a Civil Engineer and influenced by the Socialist thinkers of the time like Etienne Cabet. Without being commissioned, Cerdá carried out meticulous studies of the living conditions inside the two-meter thick wall that surrounded the old city. In the 1850's, Barcelona was going through an era of rapid industrial and economic development. With the arrival of the Industrial Revolution, the introduction of factories, and the density explosion, poor hygiene conditions inside the wall worsened. As a result, epidemics like cholera beset the city attacking all classes. Ironically, the most advanced city in Spain was also, at some level, the most inhuman.

Cerdá's plan was different from others in the sense that it was a substantially more complete project based on an egalitarian grid, an economic proposal, and a comprehensive circulation system. Notwithstanding, the most important aspect of the plan was that Cerdá's design intention was not only about form but functionality and that this functionality was a response to the industrial society's conditions. Due to his strong connection to the working class and his radical, utopian, and egalitarian proposal, his plan was not well received and had to be partially imposed by the central government. It eventually took decades for Catalans to digest and applaud Cerdá's work.

The main purpose of this thesis is to reveal Cerdá's vision, that of an engineer with a socially-progressive and technical mind. Although much research has been done about the Eixample plan itself, little has been written about the meticulous, almost obsessive studies Cerdá did of conditions inside the wall and about how these studies led to the physical plan. This thesis, first of all, describes the city's conditions and how Cerdá was receptive to them. Secondly, it shows how he combined a vision with the capacity to think about cities as shifting social entities, receptive to infinite agents. Finally, it describes Cerdá's design approach and the result of that process: the Eixample plan and how it exists in today's world, making it a remarkable urban design example.

Thesis Supervisor: Julian Beinart

Title: Professor of Architecture

Valeria Alonso Fernández

**CERDA AND BARCELONA:
RESEARCH AND PLAN**



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Valeria Alonso-Fernández

TITLE

I began doing research about the urban development of the city of Barcelona during my first semester at MIT, almost two years ago. I chose to study Barcelona among other cities because of its size, position near the sea, orientation, magnificent streets, and architectural background. At that time, the Eixample was a neighborhood considered by me as the "heart of Barcelona," and the name of its creator, Idelfonso Cerdá, was one I had only vaguely heard of, even though I had spent a year living in Barcelona.

There are different opinions about the way Cerdá's work has been appreciated, something strictly necessary to remember during the reading of this thesis. The last time I visited Barcelona in order to do research, for example, I met with Joaquim Sabaté, a research worker and urbanism professor at the *Universidad Politecnica de Catalunya*. He was deeply involved in compiling Cerdá's studies, even his personal diary, and he argues that Cerdá's legacy is well known and valued in Spain.¹

But, while doing my research, I have found that there are many different views, not only about the way Cerdá's work has been valued through the years, but about the way it has been understood. In fact, many different social and political forces are involved in the equation; moreover, sometimes it is just a matter of lack of teaching and publishing. Even if we leave these possibilities aside, and concede that Sabaté may be right, and that Cerdá's studies are well valued in Barcelona and in Spain, my goal is to produce an English-language study that brings together Cerdá's life, his studies, the situation of the walled city of Barcelona as the background and necessity for an expansion, and the Eixample plan as the final outcome. As a result, this thesis will present a narrative of the way the extension plan was conceived by the man that designed it, and the agenda behind the physical plan. Shortly after his death, a local paper wrote:

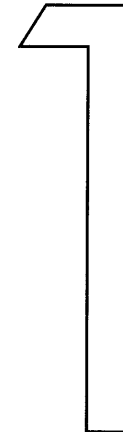
Mr. Cerda was liberal and talented, two circumstances which are harmful in Spain and tend to create many enemies. (...) He had a great love for the country in which he was born. (...) Barcelona, however, has not named any of its streets after Cerdá, nor has it even dedicated any inscription to him; but it doesn't matter. Mr. Cerdá erected his own monument, the Extension plan –a timeless memorial, superior to any others that his fellow citizens might dedicate to him.

La imprenta newspaper, Barcelona, August 1876

Yet even in Spain, as recent as 1971, Fabian Estape could write: "In short, we could say that, just until recent years, what was known about Idelfonso Cerdá I Sunyer was not much, and still among that, a whole amount of arguments were mistaken."² Whatever the case, the fact that drives me most to write about Cerdá is reading Cerdá's own writings:

It is a pity that gratitude and justice all too often take years or even centuries to come one's way! What a pity that the rewards for talent and heroism are rarely reaped within the same generation that ought to have admired them! The hearts of men, usually enslaved by envy, are unwilling to acknowledge the stature of their contemporaries, leaving to future generations the noble tasks of rewarding them.... I am leaving, perhaps forever, the city of Barcelona, for which in good faith I can say I have striven to do my outmost despite, harbouring deep inside me the conviction that it will never know how to thank me for it.³

1.
CERDA'S FIRST IMPRESSION OF A CITY:
BARCELONA IN 1831



Valeria Alonso-Fernández

1 CERDA'S IMPRESSION OF A CITY: BARCELONA IN 1831

1.1 Cerdá's arrival

In 1831, sixteen-year-old Idelfonso Cerdá I Sunyer was traveling from his hometown Centelles --a small, rural town in the northeast outskirts of Barcelona-- and finally approaching, for the first time, "the big city." His stylish horse-drawn carriage⁴ slowly entered the recently built Passeig de Gracia, a magnificent six-lane boulevard carefully designed as the road connector between the old, walled city, and one of the suburban towns: Gracia. Everybody gossiped about Barcelona's growth, but nobody ever took the time to really describe what Cerdá was witnessing. He was struck by Passeig de Gracia's "urban quality": the symmetrical trace included six tree lanes, two pedestrian lanes, and a central space for carriages. Moreover, he was astonished by the several activities that took place in this avenue, transforming the open space into a new place where people met.

Although Cerdá's aristocratic rural family had become established in Centelles a long time ago, it had a strong trading and visionary background. This, together with his dream of studying mathematics and architecture, is what induced Cerdá to travel to Barcelona at the age of sixteen, while knowing nothing about cities and how they were socially and physically organized. He soon became part of the migratory flow Barcelona was experiencing, due mainly to industrial development. Cerdá encountered the city's prosperity as he enjoyed the promenade in Passeig de Gracia, without expecting what he was about to observe.

The carriage stopped as soon as they reached the thick, two-meter wall which limited the old, enclosed city. Apparently, they could not move due to constricted traffic; carriages inside the walled city moved only with difficulty through the narrow roads. Cerdá decided to walk, entering a very narrow, almost dark road. That road led him to a "Little Passeig de Gracia," a road named Las Ramblas, with even more people and activities, an incredible market which people called "Boquería," and a theater. The old city's streets and general orthogonal layout had originally been traced by the Romans in the fifth century, who followed the notions and concepts of Greek civilization. The Romans traced two main axes: *cardo maximus* and *decumanus maximus*. The intersection between these two axes became the center of the city with a political, civic, and cultural use,⁵ creating a "grid" that organized the terrain.

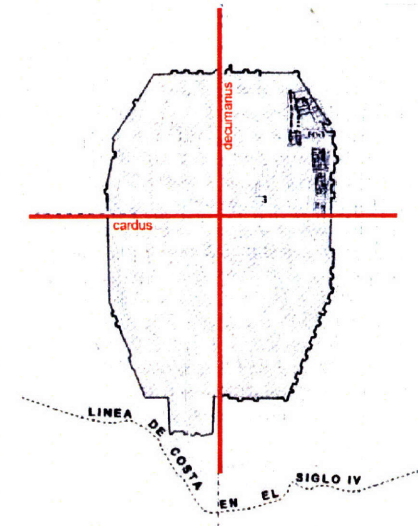


Fig. 1: Two main Roman axis (*cardo maximus* and *decumanus maximus*)

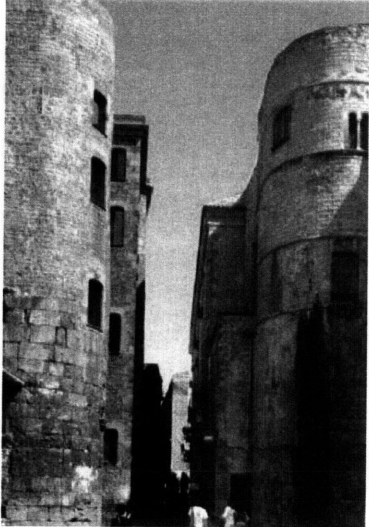


Fig. 2: The intersection of the two axes became, since then, the center of the city (Plaza Sant Jaume)



Fig. 3: Passeig de Gracia was the continuation of Portal de l'Angel in the old town, that linked the walled city with Gracia.

Cerdá's journey transformed into an unexpected experience where all his senses were at work. Everybody in the city seemed to be busy, moving, going somewhere, or finishing meticulous tasks. It was as if his eyes were not quick enough to glance at every image around him. The smell was unpleasant but he was distracted by the elegant women that passed by him wearing long dresses and carrying a *sombrilla* or parasol. The sound was not pleasant either, it was too noisy for Cerdá, but he liked feeling the energy of the city. People passed by and pushed him; coming from a town where space was understood as an inexhaustible resource, the compact city of Barcelona seemed to have used every centimeter available. He felt uncomfortable and extremely interested at the same time; he encountered a city full of contradictory panoramas.



Figs. 4 and 5 Ruins of the Roman wall that we can still see today, are used as building structure.

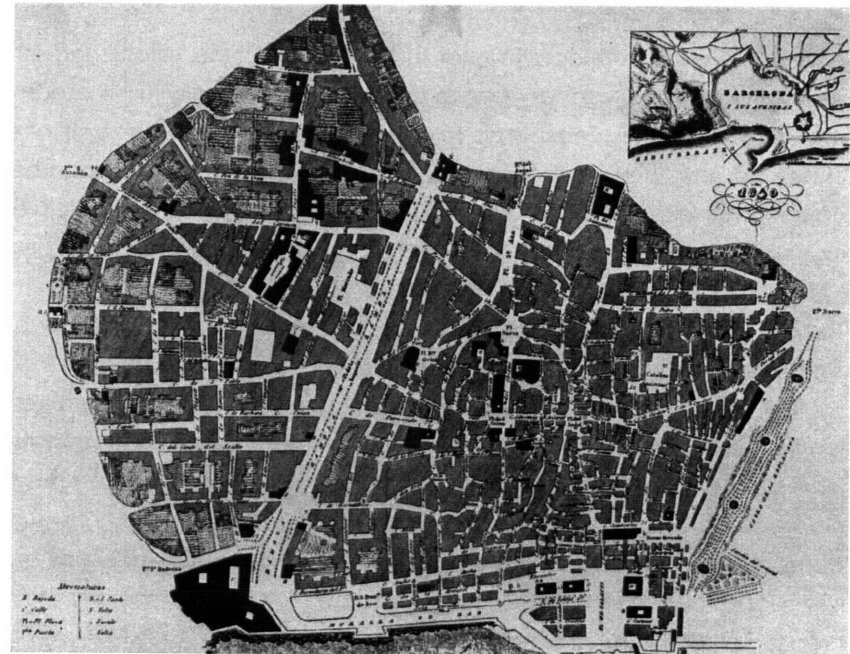


Fig. 6: The old city of Barcelona in 1840; the linear trace, Las Ramblas, was the first designed open space in Barcelona.

1.2 Understanding the Barcelona that Cerdá encountered

In 1831, Barcelona was experiencing progress and social improvement. There was a certain order in the air, in the way people related to each other in the streets. The Spain of those times was very classist –something that especially interested Cerdá–, and hierarchies were clearly marked, not only between families but also in work organization. Civic values were created as a sequence of elements that were needed in order to smooth the conduct of social relations. Trading became more than “selling and buying;” it transformed into manufacturing, mainly of textiles. Iron production was also essential for tools and for shipbuilding, as overseas trading relations increased.

Cerdá encountered a city living a significant commercial and economic revival due to three main reasons: the first was its geographical location, where diverse civilizations superimposed and created a rich juxtaposition of cultures. The second was the blending of different types of artisan classes, and the third, the trading relations that were supported especially by Jewish communities. This revival was a strong influence on the whole Catalunya sector, as Fernand Braudel describes:

*Without Barcelona, that is, without the combination of its artisan class, its Jewish merchants, its adventurous soldiers and the thousand resources of Santa Maria del Mar, it would be difficult to form a full picture of the maritime growth of the Catalan coast (...), which was a port of call not just for sailing ships from the Balearic Islands, but boats from Valencia, whale-boats from Biscay and ships from Marseilles and Italy.*⁶

Surprisingly, it took three decades for the Industrial Revolution to arrive in Barcelona, starting at precisely the time when Cerdá encountered the city (1831). Steam power was being introduced; the first steam-powered machinery in Barcelona was owned by José Bonaplata in 1833 in the Raval neighborhood. The arrival of industrialization had two consequences: the first was that a new elite class, formed by a few families, owners of the big factories, was created.⁷ The second was that the working class believed that their work was being stolen because their labor was being replaced by machines that relied on water and steam power. General discontent, due to the entry of the machinery, was common inside the wall, especially among the working class, which was poorly treated, had low wages and a short life expectancy. Reflections of discontent and concern occurred; strikes

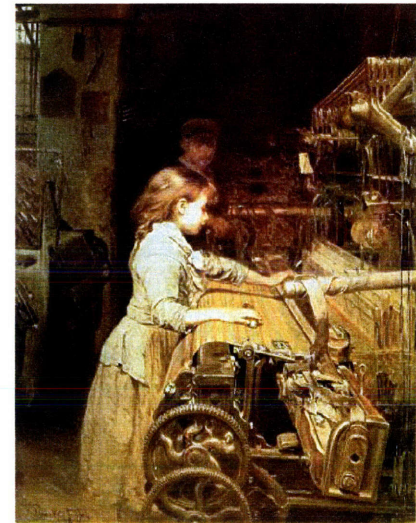
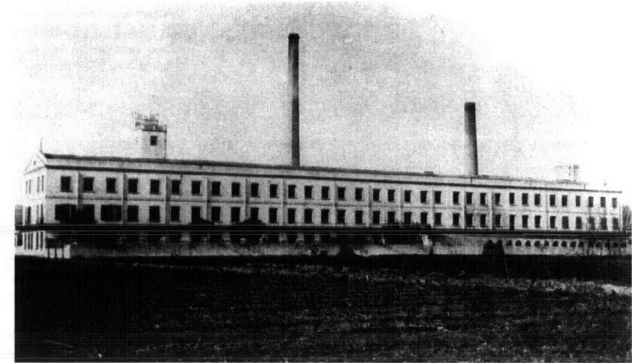
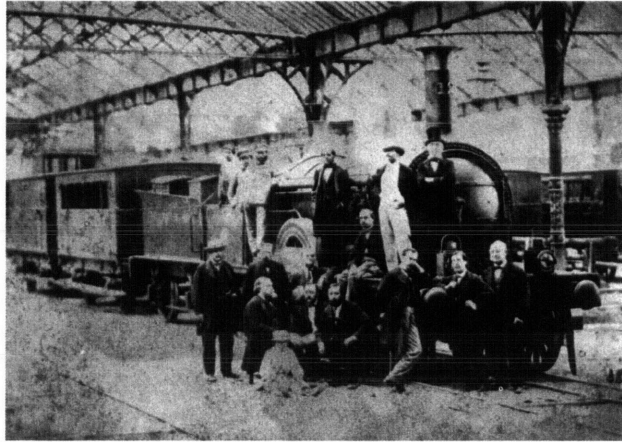


Fig.7: "La tejedora," by Joan Planella.



Figs. 8, 9: Jamandreu's textile plant and workers.

were not unusual and the Bonaplata factory was even burned down. Also, there was a certain air of restlessness. In the first half of the nineteenth century, industrialization arrived along with a strong ideological rejection against absolutism. Cerdá witnessed these phenomena –class differences, economic difficulties– in a very passionate and patriotic way, developing a special connection with the working class. **He realized that the pro-**

gress Barcelona was experiencing brought with it many consequences.

The most relevant and notorious was density. Barcelona was going through an urbanization process, where people from the suburbs traveled to the city because, like Cerdá, they were curious and believed it was the platform for progress. Besides the trading and manufacturing revitalization, the density explosion was given impetus by the construction of the Citadella, a military fort that displaced the entire Ribera neighborhood –almost twenty per cent of the population: schools, churches, hospitals, and more than 1,000 houses – to the center of the city. The construction of the fort symbolized the Central power. The intention was to control the walled city from the Citadella and the Montjuïc fort. The humiliation felt by the displaced citizens that once occupied the Ribera neighborhood is represented in Jacint Verdaguer's poem:

*Tenyit de sang encara, rugint com un fera,
lo rei se'n baixa al barri famós de la Ribera
davant sos granaders:
--Deixau aqueixos glavis, preneu magalls i relles
--los diu--, i enderrocau-les, aqueixes cases velles,
catau de bandolers.*

*Arreu arreu s'ajauen los grossos casalicis,
los monestirs, escoles I emparadores hospicis,
lo temple I l'hospital;
a rengles los tuguris s'aplanen en la sorra
i el mes joioj dels barris barcelonins s'esborra
com xifra en un sorral.*

*Quan ja no queda raster com d'aigua escorreguda,
d'aquelles pedres, ossos de la ciutat volguda,
n'aixequen un castell,
lo de la malastruga I odible Ciutadela,
que naix a Barcelona com una erisipela,
enmig d'un rostre bell.⁸*

*Boltered with blood, roaring like a wild beast,
the King goes down to the famous Ribera quarter
before his grenadiers:
"Drop your swords, take up hoes and ploughs,"
he says, "And tear down these old houses,
these bandits' lairs."*

*Around, around lie the great mansions,
the monasteries, the schools, the shelters,
the church and the hospital:
row by row the shacks are flattened into the sand
and the happiest quartier of Barcelona is erased
like a number drawn on the beach.*

*When, like water drained away, no trace remains
of these stones, the bones of the beloved city,
they build a fortress,
the ill-fated and hateful Citadel,
born in Barcelona like erysipelas
in the middle of a lovely face.*

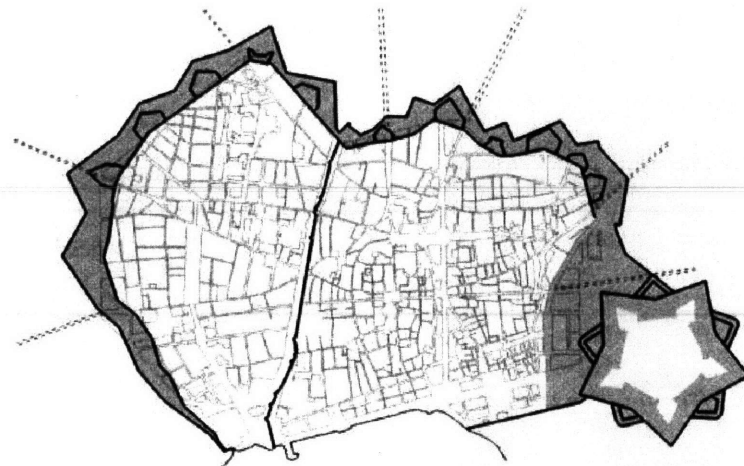
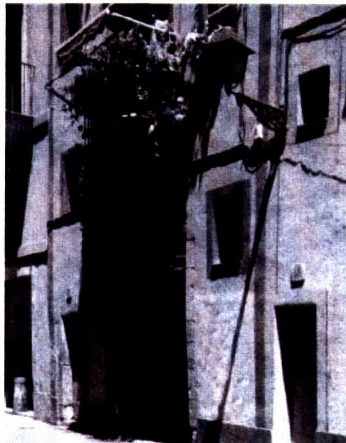
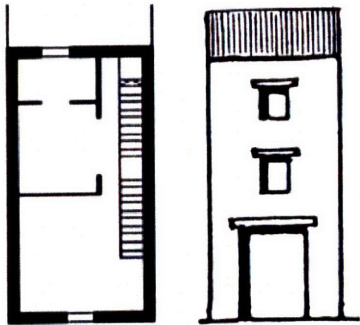


Fig. 10: The Roman Wall and the Citadel forti.



Fig. 11: The villes noves, which grew towards the east coast for trading purposes.



With the construction of the Citadela, villes noves or new towns spontaneously developed outside the walled city as the city began to expand due to the movement of the people, not only because of the displacement of the people but also as a result of trading activities. The first attempt to solve the density problem took place eighty years before Cerdà arrived to Barcelona, in 1753. The *Barceloneta*, or "Little Barcelona" was the first planned neighborhood to be constructed outside the walled city. The plan, designed by J.P. Verboom, had a triangular layout with a regular grid that followed a north-south orientation. This apparently well-designed plan did not take long to suffer the density problem, just as the center of the old city. For example, the original two-story house designed by Verboom was located in a 8.40 x 8.40 meters parcel. These houses were transformed first into *mig houses*, or divided houses; eventually, three extra floors were added to the buildings in order to accommodate the people.

Accommodating people was also a struggle inside the walled city. Buildings needed to house more people and the City Council did not wish to touch the building facades and would not allow the streets to be narrowed, since it was already becoming more difficult to circulate in carriages throughout the city. This is the reason why the artisan's house from the medieval city, which merged the residential and working activities, transformed into the collective housing type. Pre-industrialization arrived in Barcelona, and besides the villes noves, outskirts towns began to slowly develop. Eventually, these towns: Sarrià, Sant Gervasi, Horta, Les Corts, San Andres del Palomar, and Gracia, grew as autonomous villages, far enough from the walled city in order to maintain their independence.



Figs. 12, 13, 14, and 15: Plan, façade, and plot division of the artisan house.

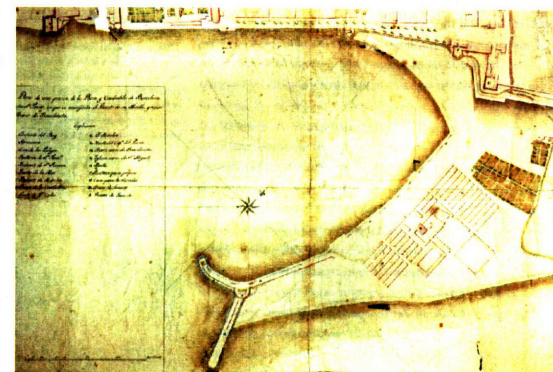


Fig. 16: The Barceloneta, located in a strip of land.

At the beginning of the eighteenth century, Barcelona's population was about 64,000; by 1830, it had grown to 150,000, having a density of 850 inhabitants per hectare, one of the highest in Europe.⁹ Thirty years later on, in 1860, other large European cities such as Paris were less dense, with 700 inhabitants per hectare.¹⁰ **Barce-**

lona stood out, not only because of its high density, but also because of the industrial city that developed inside the Roman wall.

Living conditions inside the wall became a major problem. Barcelona suffered from poor sanitation that worsened with the arrival of the Industrial Revolution. Epidemics began to gain power as cities increased in size, and Barcelona was no exception; several epidemics beset the city, attacking all classes. With industrialization in full swing, population flows increased from one urban center to another, bringing public health issues. With immigration, diseases arrived and spread; among them, typhoid, dysentery, and the worst, cholera.

Epidemics began to gain power as cities increased in size. Paris and London are appropriate examples: Paris, London, and Barcelona have a similar hygiene history. In London waste increased in a dramatic way: by 1851, the number of people who were producing and

	Superficie en hectáreas	Número de habitantes	Población específica por hect.	Superficie que corresponde a cada habitante en metros
Barcelona	202,37	152.300	741	13,59
Barceloneta	24	12.736	531	18,86
Londres	21.000	1.924.000	91	109,14
Londres (la Cité).....	259	125.000	483	20,72
París	3.438	1.053.897	306	32,62
Madrid (la parte edificada).....	493,3	206.507	419	23,89
Madrid (todo lo cercado).....	780,2	206.507	265	37,78
Filadelfia	685,87	220.000	321	31,18
La Habana	398	138.000	347	28,84
Santiago de Cuba.....	115,2	24.000	208	48,00
Matanzas.....	165,3	20.000	121	82,65
Palma de Mallorca.....	111,5	40.480	363	27,54
Valladolid	154	28.000	182	54,95
Segovia	116,6	12.000	103	97,08

Fig. 17: Barcelona was the densest city.

moving through garbage had increased tremendously. Industrialization was in full fledge and increased flows of population from one urban center to another increased public health issues. In the case of London, immigration brought numerous diseases, most probably from the Baltic ports as well as from immigrants who passed through Europe on their way to America.

One of these diseases was cholera, closely studied and treated firsthand by Dr. John Snow. He analyzed different cases, in a very detailed way. Snow was the first to realize that cholera was contagious not by touching or inhaling, but by swallowing. This something was water. He demonstrated how the waterborne disease was transferred from one neighborhood to another, because the people shared the same pump and, therefore, the same water conditions.¹¹

When cholera arrived in the cities,¹² waste increased in an even more dramatic way. We can imagine the appearance of London, Paris, and Barcelona, by reading Patrick Suskind's description in his book *Perfume*:

In the period of which we speak, there reigned in the cities a stench barely conceivable to us modern men and women. The streets stank of manure, the courtyards of urine, the stairwells stank of moldering wood and rat droppings, the kitchens of spoiled cabbage and mutton fat; the unaired parlors stank of stale dust, the bedrooms of greasy sheets, damp featherbeds, and the pungently sweet aroma of chamber pots. The stench of sulfur rose from the chimneys, the stench of caustic lyes from the tanneries, and from the slaughterhouses came the stench of congealed blood. People stank of sweat and unwashed clothes; from their mouths came the stench of rotting teeth, from their bellies that of onions, and from their bodies, if they were no longer very young, came the stench of rancid cheese and sour milk and tumorous disease. The rivers stank, the marketplaces stank, the churches stank, it stank beneath the bridges and in the palaces. The peasant stank as did the priest, the apprentice as did his master's wife, the whole of the aristocracy stank, even the king himself stank, stank like a rank lion, and the queen like an old goat, summer and winter.¹³

Due to conditions inside the wall, residents of Barcelona contended for a long time that the walls needed to be torn down, generating a strong collective pressure. Hygiene conditions inside the wall caused a high death rate and a public health crisis. Idelfonso Cerdá was witness not only to the terrible circumstances inside the wall and to the results that the unsanitary conditions brought --cholera epidemics-- but also to the fragile political situation due, among other things, to the discontented working class. He witnessed all these events in a contradictory city that on one hand had beautiful, majestic plazas like Plaza Reial, and a growing industrial economy, and on the other, had density problems, difficulties with the working class, and people dying due to poor hygiene conditions. Cerdá encountered a splendid city going through probably one of its best, and at the same time most fragile, political and social periods.

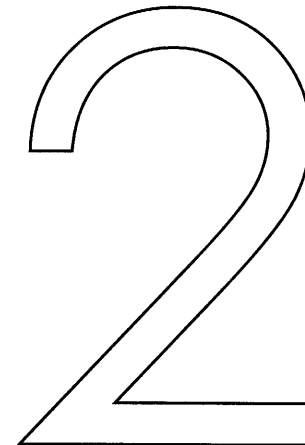


Fig. 18: Plaza Reial.

Valeria Alonso-Fernández

2. CERDA'S STUDIES

This chapter will describe Cerdá's academic and professional development, discussing how he employed his impressions of the city of Barcelona as a catalyst to do research about different cities, especially Barcelona and its working class. It will also describe how the utopian socialists influenced him in order to develop an egalitarian project. Although it will not try to be a biographic account of Cerdá's life, it is important to mention key dates in order to understand the urban development of the city of Barcelona and how Cerdá, through his studies, influenced its history.



2 CERDA'S STUDIES

2.1 Cerdá, the Engineer

Cerdá's second important encounter with a big city was when he decided to move to Madrid at the age of 19 in 1835, after three years of observing and *absorbing* the situation in Barcelona. In Madrid, he entered the controversial and highly rated *Escuela de Caminos, Canales y Puertos* to study civil engineering. The school paid attention and actively followed the violent political events and the social movements that took place in Madrid and Barcelona in the first half of the nineteenth century, which fitted perfectly with Cerdá's personal interests. At that time, Isabel II, María Cristina de Borbon's daughter was named Spain's first queen, preceding Fernando VII, in a period of palace intrigues, a controversial succession, and military and political encounters.

Cerdá's main goal, which probably was born from the first impressions he had of the city of Barcelona, was to develop the urbanizing idea. It is important to mention at this point that from his first arrival to the city, and maybe before that, Cerdá had in mind the idea of learning about cities and their conditions, in addition to his interests in studying mathematics and architecture.¹⁴ We can also infer that the application of the machine seen in Barcelona is what impressed him most, developing a sense of "urbanity." He took this idea and concern to Madrid, where he intended to expand his thoughts.

During his years in Madrid, Cerdá was aware of the events that took place in Barcelona: the contraposition between the economic take-off of the city due to industrialization, the discontented working class, and the unsustainable public health situation contained and delimited by the walls.

In 1839, residents of Barcelona contended more than ever that the walls needed to be torn down, generating a strong collective pressure. Since its origins, Barcelona had been fortified, and for more than a century and a half it had been flanked by the Ciutadela and Montjuic forts. The most diverse philosophers and scientists, including Cerdá, argued the necessity of pulling down the walls in order, among other things, to dissolve political domination; however, economic and political interests were involved. The wall not only provided a shelter but also oppressed the people that lived inside. As Julio Caro Baroja in his *La ciudad y el campo* wrote:

The city is a fortress-- not always to defend itself from possible enemies, (but) also to oppress people (possible enemies) from the inside.

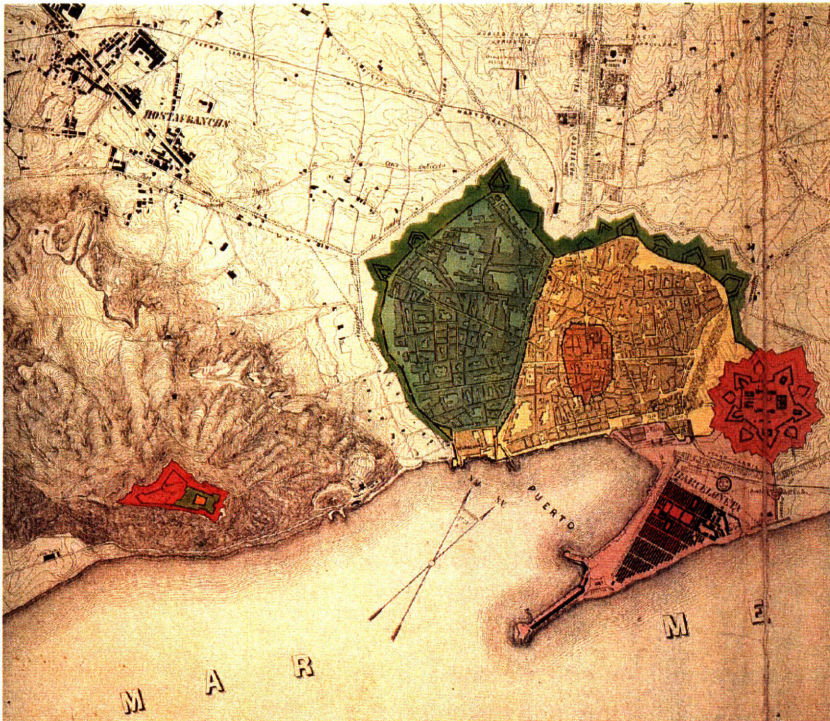


Fig. 19: The walled city of Barcelona. The orange symbolizes the oldest, Roman city. The green area, on the west side to the Ramblas, is where the Vil·les Noves established. The Citadella and Montjuïc forts, as well as the first neighborhood outside the walled city, the Barceloneta, are shown.

1841 was a decisive year for Cerdá's life for three main reasons: First of all, he graduated as an Engineer. Second, he enlisted in the *National Militia* --a democratic citizens' institution-- that allowed him to create significant contacts that helped him in his career and that put him in touch with the working class movement in Madrid and Barcelona. Enlisting in the *National Militia* was also relevant for Cerdá because he was eventually named lieutenant, and with that, he attained economic independence.¹⁵ At this time he formally began his public service and political career. As Manuel Angelon, a close friend to Cerdá, said: "Cerdá viewed politics as a practical science, and for him what was not practical, was not politics."¹⁶ It is interesting to see that throughout his life he could not detach himself from politics, and that he worked for two cities with extremely different political ideologies.¹⁷ Also at this time, a special connection between Cerdá and Madrid was born.

The third reason why 1841 was a key year was that as he finished his studies in Madrid, he was commissioned to perform different jobs by the *Administración del Ministerio de Fomento de Ingeniería*, which required him to travel to Teruel, Zaragoza, Valencia, Gerona, and Barcelona. The fourth, and most relevant reason for this study is that, due to his traveling, this was when he formally began his social studies. Cerdá's intention was to build

up his *idea urbanizadora*; he had a scientific interest in showing the technological transformation of societies, based on what he learned in the School of Engineering, added to his interests and concerns from what he had seen in Barcelona.

From 1841, he spent the following seven years involved in projects for highways and infrastructure work for several cities around Spain and France. Even though at this point Cerdá had already made some studies and considerations about social philosophy, in 1844 he saw for the first time in France the use of steam for land trans-

portation. He was astonished. He realized that with these trains not only were considerable amounts of goods transferred, but also passengers of all kinds and social classes were able to travel. His astonishment is reflected in the following passage:

What surprised me, in spite of the fact that I had imagined this in my mind many times, was to see those long trains which, loaded with a large quantity of merchandise, a large number of passengers, of all sexes, ages, and conditions, came and went, appearing to be whole populations hastily changing domicile. After overcoming the surprise of this spectacle, new a that time for me, my thoughts were elevated to considerations regarding the social order, specially when I observed the difficulty with which that mob of unexpected guests penetrated through the narrow doors, scattered in the narrow streets, in search of the shelter in the mean houses of the old city.¹⁸

It is possible that during one of Cerdá's visits to Paris, he came across Georges Cuvier's theories, at the time exposed at the *Jardin de Plantes*. Cuvier's theories were developed and completed by 1805 in his *Lecons d'anatomie*. He proposed that the organ structure, position and functionality is the correlation with other organs, arguing that in order to study and catalog any living species it is vital to first relate it to other species.¹⁹ These holistic theories amazed Cerdá; a relevant fact to know in order to understand his design structure.

Dissecting more of Cerdá's personal life, the year 1848 was a complex, harsh year. On one hand, 32-year-old Cerdá married 19-year-old Chlotilde Bosch y Calmell. We can infer, because of Chlotilde's young age that he met her when he was commissioned by the *Ministerio de Fomento de Ingeniería* in Barcelona. The daughter of a banker, Chlotilde belonged to a high bourgeois class. Although Cerdá was not unfamiliar with such a lifestyle, their beliefs and interests contradicted each other. They had four daughters but eventually separated. Also in 1848, Ramón, Cerdá's second oldest brother, died from tuberculosis. José, the oldest, died in 1838, so Ramón's death made Cerdá the family heir. He was at that moment not only in charge of the "Mas Cerdá," the Centelles property that had been owned by the family for many generations, but also in charge of continuing the family's commercial relationships.

Cerdá's interests were focused on other subjects than family business; he had scientific, social, and philosophical interests that involved movement, communication, transformation, conflict, and succession between social classes. He conceived a new discipline that could bring together all his interests: "urbanization." In 1848, and impelled by the personal events that took place in his life, he resigned his post working for the Ministerio de Fomento de Ingeniería and decided to devote his time and fortune to developing his idea urbanizadora, formally named *Teoría General de la Urbanización*.

2.2 Cerdá, the Socialist

In order to develop his idea, Cerdá continued to be involved in social movements in Barcelona, with a special interest in working class conflicts. Catalunya in 1848 was gaining relatively more independence from the rest of Spain as it was enjoying considerable industrial and economic progress compared to the rest of Spain, mainly due to the textile industry that was growing in Barcelona. A fact that made this possible was the creation of banks and the ensuing availability of loans to corporations. Spain ranked fourth in textile production after England, France, and the United States. Nevertheless, as previously mentioned, the discontented proletariat of Barcelona was living in very poor conditions, with low wages and coexisting with a consolidated bourgeois industrial class.

It is also relevant to mention at this point that in 1848 Europe was going through significant transformations. With the French Revolution, a radical social and political system came into being: the working class gained power vis à vis the bourgeoisie, becoming a self-conscious, independent force. With the labor movement, it was no longer a conflict between rich and poor; a new class, the proletariat, became conscious of itself as facing the employers, giving increased confidence to the labor movement. Eric Hobsbawm in his book "The Age of Revolution," describes how the laboring classes were stimulated: **"[T]he very novelty and rapidity of the social change which engulfed them encouraged the labourers to think in terms of an entirely changed society, based on their experiences and ideas as opposed to their oppressors'. It would be co-operative and not competitive, collectivist and not individualist. It would be 'socialist.'"**²⁰

The laboring, revolutionary movement was seen by many as a self-defense movement where the working class organized, protested, and rebelled against the established governments. It was also a way of life that, together with French philosophers and thinkers, influenced the rest of Europe's and the world's theorists, including Cerdá.

With Barcelona going through these social changes, it seemed like the perfect city for Cerdá to stay in, in order for him to develop his personal interests. One of his interests was strongly influenced by socialist theories, which arrived late to Barcelona due in part to Church opposition and high illiteracy. Only a minority of romantics shared Cerdá's ideals; the group of progressives in Barcelona was a group of radicals that, for security reasons, created techniques to communicate and meet secretly throughout the city. The leader of this socially progressive group was Abdó Terrades, born in Girona in 1812.

Etienne Cabet, a French philosopher, was the main influence in Spanish socialism, even though he never went to Spain. Similarly, Cabet was influenced by Charles Fourier, who had the utopian idea of creating a self-sufficient, well-balanced society. In this society, the equilibrium would be achieved by balancing professions –the numbers of geniuses, mathematicians, and musicians, among others. During Cabet's trip to England, he met Robert Owen, who fought against child labor and made a strong impact with his "A New View of Society."

Cabet's masterpiece was "A Voyage to Icaria" (1839), where Icaria meant "the ideal society." Law, as an unchangeable product of philosophy, was the only thing that existed in his model. "A Voyage to Icaria" is about a dialogue between an exiled artist and an aristocrat and how they dreamed about this "ideal society," where no social hierarchies existed. Before we enter into the physical details of the Icarian plan, it is important to describe the agenda behind it.

The Icarian Commune was based on a peaceful ideology –with the necessity of creating a society formed by people that would share family, physical, professional, organizational, and social values. The conditions of these values were considered equal, no matter the sex, the language, the age, the nationality, or the race. The social and physical organization of the community should be organized based on this equality, brotherhood, and solidarity. With these principles, the goods produced would be shared and enjoyed equally.²¹

Entering into more specific details, as Cabet described in his *History and Constitution of the Icarian Community* for the physical and social organization, in the Icarian Commune "Everything is made in quantity for all citizens.... Each manufacture and each product is regulated by consumption, which in turn is determined by the necessary statistics....The workers distribute themselves according to the need of each factory; each workshop chooses its manager....There is a school for all children, with its gymnasium; a museum; a hospital with its pharmacy and its baths for all the sick; a library; a printing-shop; one or several theaters; public games; a common house or city hall for public assemblies, government, meetings, speeches, balls, concerts; a temple, etc., etc....As soon as possible there will be one or several large reservoirs for distributing to all buildings light, heat and water, in such a manner that each family may have its own particular bath."²²

Physically speaking, Cabet's Icaria was **“a territory divided into a hundred exactly equal departments, with a provincial capital in the exact geometric center of each. The general capital, seat of all administration, is a circular city called Icaria. Its broad avenues lined with trees and bordered by canals, radiate from a central point. Ring roads divide it into sixty equal quarters, each of which is a sort of theme park, built in the architectural style of one of the ‘sixty principal nations of world history.’”**²³

Icaria was founded in January 19, 1849 in Nauvoo, Illinois, on the Mississippi River, in the center of the United States.²⁴ Cabet chose this place because of the climate and because it had recently been abandoned by a Mormon colony. This apparently was expected to make the settlement easier, but to the contrary, the project failed. Cabet argued that it would have been easier to establish Icaria either in France or in England; establishing it in such a faraway land involved many complications that were not taken into account. Nevertheless, and although Cabet did not have many followers, his agenda had a strong impact among socialist utopians.

Socialist utopians of those times, like Henri de Saint-Simon, were deeply attracted to science and technology. Another example of this is Narciso Monturiol, one of the Spanish thinkers Cabet influenced the most. Narciso Monturiol, who declared himself a true “Cabedian” was a Catalan lawyer involved with the intellectuals (musicians, poets, writers) of the Barcelona of those years. Monturiol was part of Terrades' group of social radicals that invented techniques to meet in the dark streets of Barcelona in order to share their ideas. What made him a true radical and not a mere liberal was that he was deeply concerned with feminism; we can infer that his feminist ideals were influenced by Cabet's. He wrote the journals *La Madre de Familia*, where he portrayed his interest in women's rights and family values, and *La Fraternidad*, where he intended to promote education and the advancement of all sexes of the human race.²⁵ His passion eventually transformed him into the new socialist leader in Barcelona: a true icon in the city. He was known not only as a positivist and a socialist, but also as the submarine's pioneering inventor. He had a dual fascination: human rights and machines, and believed in machinery as a tool to create lifestyle equality among societies; influenced by Cabet, Monturiol believed in the positive moral aspects of “Science”. In Barcelona, Monturiol became a hero by demonstrating in a new and different way that Catalans, in the second half of the nineteenth century, were really part of the “Modern World.”

Josep Anselm Clavé was one of the musicians with whom Monturiol was connected. He was not only involved in music, but also in politics. He himself sang in proletarian bars; this firsthand experience led him to write songs like “The Seamstress” and “The Fishermern,” where he illustrated the poor conditions of proletarians. Consequently,

he was put in jail for two years for participating in one of the revolutionary revolts that took place in 1843. During those two years in jail, he created a choral association, formed by artisans and workers. He believed that different social classes could unite and benefit from each other, politically, socially, and culturally. The most significant society was created in 1845, and named *La Fraternidad* (eventually renamed as *Euterpe*). Through this organization, Clavé carried out important cultural work in the industrial periphery of Barcelona.

Cerdá was strongly influenced by the revolutionary movements and by the socialist utopian thinkers of the time, which affected his own theories.

He also continued with his political career –still being an active member of the National Militia–, and was named deputy in 1851, becoming part of the City Council of Barcelona in 1854, when Cirilo Franquet was named Civil Governor. Franquet's administration took up King Fernando VII's original urban objectives. During his reign, Fernando VII had attempted to displace Barcelona's cemeteries outside the wall in order to turn the city space into plazas.

Also in the same year, Barcelona was attacked by a new cholera epidemic. The feeling of discontent increased inside the walls: the working class went on strike and the working class banner had been confiscated as a way of controlling their movement. Cerdá, who never lost contact with the working class, decided to meet with them in the Plaza Sant Jaume in order to support them and negotiate their rights to defend what they thought was fair.

Cerdá's role in the recovery of the banner was very significant for his political career, as it was an incident that represented his ideology. However, his behavior and solidarity with the downtrodden was not very well received by the authorities and the affluent. In a short time, and because of the banner incident, he became a hero among the city's workers and traveled to Madrid to represent the workers' association.

Other strikes began to take place, and revolts were, as mentioned before, commonly seen in the streets of Barcelona. Queen Isabel II intervened and in the second half of 1850 named Juan Zapatero Captain General. Zapatero was known as "the Catalunya tiger" because of his ruthless actions. In parallel with the strike situation, the unsustainable public health condition was becoming a major problem. Cirilo Franquet and the City Council needed to get involved, and on August 7, 1854, they started to tear down the walls without the permission of the federal government.²⁶ It is important to point out that Barcelona, being part of Catalunya, has historically made an effort to maintain its independence from the rest of Spain, as this poem "El Cant de la Senyera" portrays:

*Oh, bandera catalana
Nostre cor t'es ben fidel.
Volarás com au galena
Per damunt del nostre anhel.
Per mirar-te sobirana
Alçuem els ulls al cel.*

*O flag of Catalunya
Our hearts keep faith in you.
You will fly like a brave bird
Above our desires.
To see you reigning there we'll lift our eyes to the sky.²⁷*



Fig. 20: Plaza Sant Jaume, the social and political center of the city where strikes took place.

2.3 Cerdá, the Researcher

Having the walls torn down was of symbolic importance for the people of Barcelona, who were finally "set free." Consequently, the idea of linking Gracia with the old city –more than by Passeig de Gracia– was being strongly considered. The railroad system had just been completed, which promoted industrialization of the outskirt towns, and therefore, a connection between the old city and the suburban world. This idea was surprisingly old; the intention of having an expansion dated from the 1830's, when plans were more modest, but hygiene was already a matter to be considered. We can infer this from the following passage, where numbers are mentioned in a simple way in order to demonstrate the lack of space and how that led to hygiene difficulties. Written in February 1838, Francesco Huarte Jauregui's extension plan states that

the Captaincy General, desirous of repairing the fortifications and the most ruined part of the walls, and constructing at the same time two large and spacious barracks, at no cost to the Government, set up what it called a Board "for public Embellishment" which commissioned Colonel José Masanés to produce a plan for the expansion of the city. (...) 75,563 square meters of land were released for sale by the War Department (...) to cover the costs of demolition and repairs to the fortifications and walls, and construction of the proposed new part, which was to run in the direction of Gracia(...)leaving an area of only 12.5 hectares for civil construction, that is to say enough space for 3,000 persons, or for 750 if the buildings were constructed in accordance with the principles required by the hygiene of urban populations.²⁸

Cirilo Franquet, following the original intentions, informed the Central Government of the necessity of making a topographical study of the city and its surroundings in order to eventually trace the Expansion Plan. Cerdá, an eminent political figure and engineer, was the logical choice to do the topographical study, which took a year to finish, impressing everyone with the results.

At this point, the city was not only physically and mentally ready for an expansion, but the unsustainable public health situation forced the City Council to finally organize a formal competition.

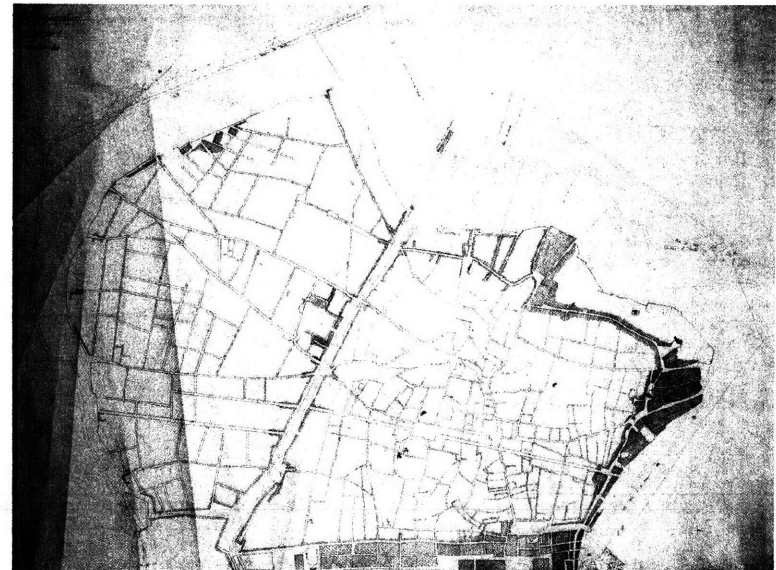


Fig.21: Topographic plans of Barcelona. This plan can be found at the Biblioteca de la Prefectura de Ingenieros, by its call number: 101-I.

Motivated by the outcome of the topographic studies and by his strong connection and loyalty to the working class, Cerdá continued with his studies. He imposed on himself the task of "data collector," which eventually would lead to his conception of "urbanization." **He knew about the Extension Plan competition, but he also believed in the necessity of gathering information beforehand. We can infer that he was influenced by Friedrich Engels, who collected statistical data and did an economic and social description of "The Condition of the Working Class in England" (1844), a precursor to Marxist thinking.** Engels argued that the Industrial Revolution worsened health conditions in cities, and consequently, for workers. During this same period (1856) Spain introduced the Modern Statistics Classification System.²⁹ Cerdá relied on this organization to collect part of his data; for the other

part, he went house to house, carefully observing and collecting. In his theories, he described the original city, portraying the main errors he found and on which he was going to base the design of the "new city."

In his study of the working class, he organized his census in four main groups: a) numbers (54,272 people were questioned); b) sex; c) age; and d) class-- from Cerdá's point of view, it was important to show the position of the worker, depending on his/her intelligence and skills. These categories were important because it marked subtle, but relevant, social hierarchies. Besides this study, he did an analysis about the different types of professions, analyzing the number of men or women that applied for the jobs, how much each one gained, and the life expectancy each had depending the job type.

With a vast gathering of statistics on housing,³⁰ occupation, profession, and income, he found a critical relationship between inhabitants and space: the bourgeois class had an average of 3.6 cubic meters of space per person, and the working class had 0.9 cubic meters, which is not even enough space to lie down and rest. He also analyzed the distribution in the houses occupied by the working class, where, for example, the kitchen and the toilet were used as one same room. Moreover, he analyzed numerous patios, classifying them depending on the amount of cel obert or open sky they had and on their programmatic function. In the walled Barcelona, where palaces were carefully designed, with large patios or gardens, the courtyards inside the buildings were demolished in order to build collective housing buildings.

Estado de las vidas medias de varias profesiones y oficios en Barcelona desde 1836 á 1847.

Profesiones	Vida media	
Eclesiasticos exclaustros.....	65'44	
Idem seculares.....	64'69	
Militares retirados.....	63'78	
Escribanos y Procuradores.....	63'04	
Comerciantes, Corredores y Fabricantes.....	57'65	
Médicos - cirujanos.....	55'65	
Magistrados y Abogados.....	54'90	
Plateros.....	54'51	
Exclaustros legos.....	51'63	
Farmacéuticos.....	45'62	
Oficios sedentarios.- (Sastres, zapateros, alpargateros, alfareros, cesteros, cepilleros, bordadores, peñeros, relojeros, &.).....	52'16	
Tejedores (especial en sedentarios).....	44'38	
Oficios estantes. {	Zootécnicos.- (Carniceros, curtidores, saladores, poceros).....	53'40
Oficios estantes en general no comprendidos en los anteriores.- (Impresores, guanteros, cuberos, sombrereros, &.).....	47'11	
Pintadores (especial en estantes).....	53'32	
Oficios semovientes en general.- (Faquines, arrieros, sogueros, &.).....	53'04	
Semovientes hidrotécnicos.- (Marineros, tinteros, taberneros, &.).....	48'04	
Militares en activo servicio.....	40'52	

Fig. 22 illustrates different types of professions such as soldiers, merchants, doctors, lawyers, and people that worked in the industry, and their life expectancy.

Cerdá realized that in the Barcelona of those days, there were a very small number of patios and that the ones that existed were extremely narrow and humid. In La Barceloneta, for example, the muggy, dark and tall courtyards, instead of providing light and ventilation, granted a counterproductive effect. Lack of ventilation was also produced by the width of the streets, which did not allow ventilation to flow. According to Cerdá's data, streets in Barcelona formed by buildings 19 meters high were 3.2 and even 1.5 meters wide.

Humidity not always came from these patios, it also came from the basement. Surprisingly, these basements were almost always used for storage. The problem was that the misuse of materials created poor insulation, and humidity eventually trespassed to the people's apartments. Cerdá studied the use of the different materials, their width, and the effect they had in constructions and in the inhabitants. According to Cerdá, one of the materials most commonly used, because of its price, and the cause of the humidity, was the thin brick.

Also according to Cerdá's studies, the terrible state of the cesspits was one of the major causes of the hygiene difficulties. The characteristics of these cesspits (shape, dimension, and materials) allowed the filtration of waste water to the surface, polluting the air and generating infections. He also observed the lack of sewers and of a system that separated the clean rain water from the black waters.

As part of his further studies, Cerdá researched how people lived, the way people moved within the city and towards the port (for commercial and travel purposes), the entry of new products through customs, the construction and expansion of buildings, and the existence of civic buildings within the city. With this research he intended to construct even more extensive theories about the city's hygiene conditions and about the lifestyle of the working people. He realized salaried workers lived to age fifty and "day workers" or people that did not have a permanent job, lived to age forty. He also did a detailed consumption analysis, primarily food, where, according to his calculations, the working class spent more than 50% of their salary on food, and could afford eating meat only once a week.

58a Consumos de Barcelona en 1849

	Barcelona	Gracia	Total diario	Precio Res.	Imp. Res.
Población	162,356	12,975	175.331	"	"
Carne de vaca y carnero por día y por persona en kilogramos	0,056	0,044	0,05	4,75	0,2375
Carne de cerda por id. de id.	0,025	0,029	0,027	7,5	0,2025
Gallina (n.º de) por id.	"	"	0,00366	12,0	0,439
Bacalao por id. de id.	"	"	0,0403	3,0	0,1209
Vino común y generoso id. en litros	0,307	0,485	0,396	2,5	0,9900
Agua por id. en litros	28,83	16,82	"	"	"
Pan por id. en kilogramos	"	"	0,5	1,8	0,9000
Aceite común por id. en litros	"	"	0,02306	4,32	0,1035
Aguardiente por id. en id.	"	"	0,00332	4,25	0,0141
Carbón vegetal por id. en kg.	"	"	0,06	0,45	0,0270
Jabón por id. de id.	"	"	0,00652	3,85	0,0251
Nieve por id. de id.	"	"	0,00241	0,67	0,0016
Sal por id. de id.	"	"	0,01347	1,65	0,0222
Id. para productos químicos en idem	"	"	0,0047	1,85	0,0077
Idem para salazón	"	"	0,00056	1,65	0,0001
Tabaco por persona y por día en kilogramos	"	"	0,00135	70,0	0,0945
Total por habitante y por día					2,7906
Días del año					365
Total por habitante y por año					1.018,5690
Habitantes					175.331
Producto total anual					178.586.721,3390

Fig. 23 shows a good consumption (mainly food) census made by Cerdá in 1849. This is one of the most meticulous studies Cerdá achieved, from which we can suppose he concluded the working class could only afford meat once a week (usually Saturdays.)

Cerdá also carried out a different census that compared the inside-wall population with the outside-wall population. The outside-wall population was formed by the outskirts towns such as the Barceloneta and Gracia. Having done these analyses, he conducted comparative studies concerning the density of other large cities, and developed space-related theories. Cerdá studied what he considered relevant cities such as Paris, Buenos Aires, Turin, Boston, Philadelphia, and Saint Petersburg. He did an urban analysis from studying historical maps and considering in a detailed way the position, weather, orientation, and climate conditions of each city.³¹

58c **Concurrencia Marítima**

Años	Número de buques entrados en el puerto	Carga en toneladas métricas
1848	7.385	315.498
1853	7.415	370.825

Fig. 24 shows the port movement of 1848 and 1853: the number of ships that entered the port together with the load in metric tons that those ships were carrying.

Poblacion especifica urbana y jurisdiccional en 1849.

	Superficie en m ²	Número de habitantes	Superficie m ² por habitante
Término jurisdiccional de Barcelona ..	20.472.994	186.214	109,94
Extra-muros, sin contar los fuertes	16.806.872	29.009	579,37
Yntra-muros, sin contar los fuertes	2.026.546	146.322	13,85

Fig. 25 shows a comparison of extension area, population and density between the city of Barcelona and the outskirt towns.

His idea was that these studies would eventually become the *Monografía estadística de la clase obrera de Barcelona en 1856*, as volume II of the *Teoría General de la Urbanización*. Evidently, he found very negative conditions from these studies: extremely low levels of nutrition, hygiene, and health regulations, high job turnover, and low income and no savings, even though people worked up to sixteen hours a day.

The results Cerdá obtained from his studies were recently interpreted and graphically expressed by Anna M. Cabré and Francesc M. Munoz. Based on the research Cerdá collected, Cabré and Munoz believe that they have "completed" what probably would have been volume III of the *Teoría General de la Urbanización*.³² After studying Cerdá's statistics, Cabré and Munoz concluded that Cerdá's investigation was in part scientific and in part experimental, as they believe he also applied his empirical intuition. Moreover, they concluded that one of Cerdá's main goals was to find a direct relation between density and mortality rate.

	Superficie en hectáreas	Número de habitantes	Población específica por hect.	Superficie que corresponde a cada habitante en metros
Barcelona	202,37	149.906	741	13,50
Barceloneta	24	12.738	531	18,86
Londres	21.000	1.924.000	91	109,14
Londres (la Cité)	259	125.000	483	20,72
París	3.438	1.053.897	306	32,62
Madrid (la parte edificada)	493,3	206.507	419	23,89
Madrid (todo lo cercado).....	780,2	206.507	265	37,78
Filadelfia	685,87	220.000	321	31,18
La Habana	398	138.000	347	28,84
Santiago de Cuba.....	115,2	24.000	208	48,00
Matanzas.....	165,3	20.000	121	82,65
Palma de Mallorca	111,5	40.480	363	27,54
Valladolid	154	28.000	182	54,95
Segovia	116,6	12.000	103	97,08

Fig. 26 shows an analysis of: population, population per hectare (density), and area that corresponded to each inhabitant. The figure demonstrates how Barcelona, among other large European cities, was the densest city.

Poblaciones	Por cada cien individuos mueren al año
Barcelona	2,857
París	2,7027
Philadelfia.....	2,5511
Charleston	2,5793
Francia (su conjunto)	2,564
Boston	2,4572
Baltimore	2,4917
En las 86 ciudades reunidas de Belgica	2,4573
Belgica.....	2,097
Lovell.....	2,1194
En las poblaciones rurales de Belgica	1,9907
Londres	1,67

Fig. 27 illustrates how Barcelona was not only the densest city but also the one with the highest number of deaths.

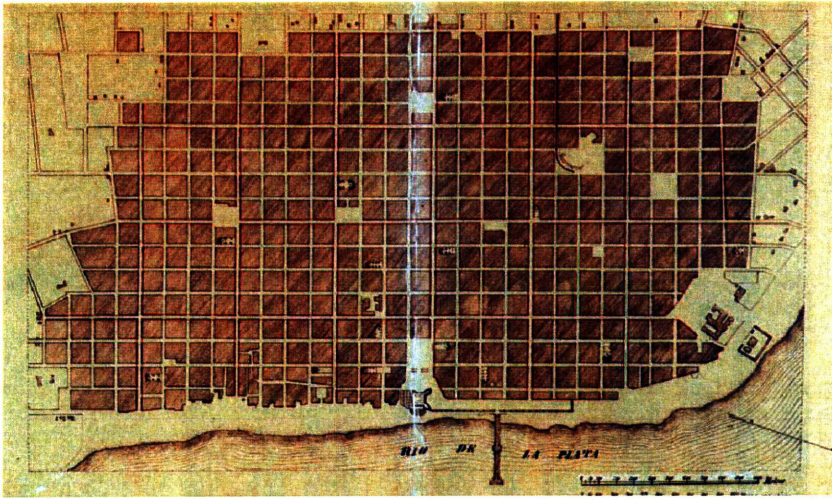


Fig. 28: Buenos Aires.



Fig. 29: Torino.



Fig. 30: Boston.

Their graphic version of Cerdá's work was interpreted into a large number of detailed maps; however, this thesis will only illustrate four: 1) housing density –inhabitants per hectare (1859); 2) construction density –dwellings (1859); 3) gross mortality per thousand (1859-1863); and 4) mortality levels based on the general death rate (1856-1865) and the cholera death rate (1865).

Figure 33 shows that the most dense (population per hectare) areas were found in the northern periphery areas of the city. A resemblance can be seen between figure 33 and figure 34 (construction density per dwelling), which shows that the greatest construction density areas were found in the edges, in the San Pere and San Pau neighborhoods, where most of the factories of the city were located. In contrast, the least dense areas were near the Ramblas and Portal del Angel, which leads to Passeig de Gracia.

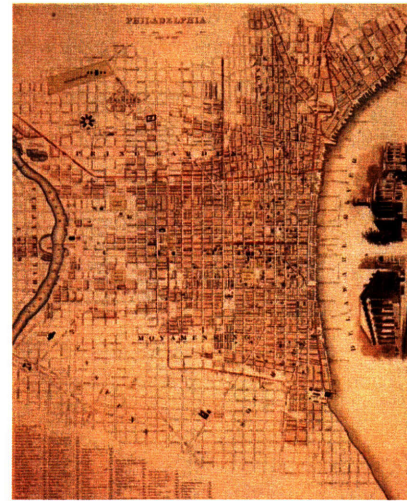


Fig. 31: Philadelphia.
These figures show some of the different cities Cerdá employed as part of his studies, basically to analyze the fabric, layout and block size of each. These also form part of his "Teoría General."

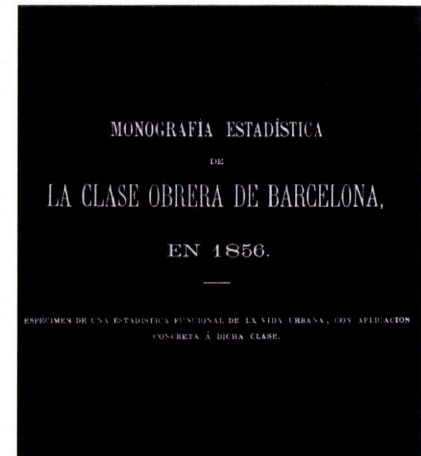


Fig. 32: Monografía estadística de la clase obrera de Barcelona en 1856, as volume II of the Teoría General de la Urbanización.

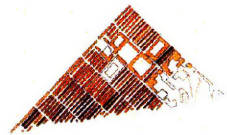
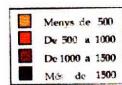


Fig. 33: 1859 habitation density- habitation per hectare.

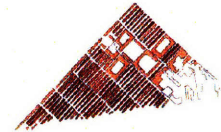
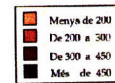


Fig. 34: construction density- dwellings.

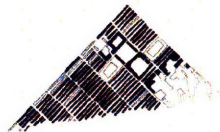
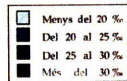


Fig. 35: 1859-1863 mortality rate per 1000.

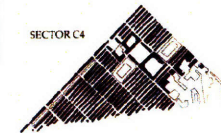
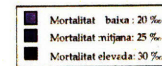


Fig. 36: mortality levels based on the general death rate (1856-1865) and the cholera death rate (1865).

Following Cerdá's interests, figure 35 and 36 demonstrate a relationship between the general death rate and the mortality caused by the 1863 cholera epidemic. The lowest levels were found near the Ramblas and along the seafront, where the Citadella used to be. Again, the periphery of the city showed a major number of deaths, probably as a result of the industrial conditions. Cabré and Munoz concluded that Cerdá's purpose was to develop a theory of the relationship between death and social status, where lack of air renewal due to a lack of space was a potential cause of death. In volume II of his *Teoría General de la Urbanización* he states:

By wards of approximately equal specific surface areas, showing that the "lower", "middle", and "higher" mortality rates in the city generally match an equivalent classification of its inhabitants according to their social position; and of unequal surface areas, showing that as the available urban surface area per inhabitant decreases, population mortality increases.

Cerdá's intention, more than to be a demographer (as he was sometimes called), was to gather detailed information about density and death rates in relation to area, and to create his own statistics in order to show the necessity of creating a homogeneous plan. He wanted to show the conditions that the actual city was offering to the different social classes (paying special attention to the working class), and the way they responded. This was his thesis, which he intended to demonstrate by doing rigorous, empirical studies. Referring to the statistics and observations from the inside-wall condition Cerdá describes:

All the administrative, economic and hygienic paradoxes are summarized in these figures; all the poverty that Barcelona, with its beautiful climate, with its highly praised culture, with its industry and its wealth conceals behind the doors of the houses of the citizens (...). We shall observe that the light which quickens all things does not enter into these houses, that there is not enough space to move and, what is even worse, no air to breathe. This cannot be described as housing that meets the standards established by civilization, especially in the interest of public health. This is no more and no less than the stacking of rational human beings on shelves, one on top of the other.³³ The air, the light, the space, the water that nature has provided around us in such abundance (...) are and always will be in plentiful supply for everybody; and yet the dwellings of the rich as well as in those of the poor, they are in dispensed with a niggardliness that is really criminal.³⁴

3. **THE EIXAMPLE PROJECT**

As we have seen, ideas of an extension for the old city of Barcelona were developed from 1830 onward. In order to categorize the projects that presented a proposal, we will, first of all, consider interesting the ones that were presented after 1850, and that occupy most of the area between the old city and Gracia. The first thing this chapter will do is describe the site for the Expansion Plan, Passeig de Gracia, its role as a linking axis, and the evolution of the site through the years. Secondly, this chapter will briefly portray some of the projects entered in the 1859 competition, analyzing the basic diagrammatic organization. Finally, this chapter will speculate as to what factors went into the final decision in the competition.



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3 THE EIXAMPLE PROJECT

3.1 The site

In order to understand any project developed after 1850, it is important to describe the physical characteristics of the Expansion site. The city of Barcelona, located next to the Mediterranean Sea and Mount Montjuic, is an inclined city. This inclination begins dramatically at Mount Collserola, which is approximately 500 meters (1,640 ft) high. Passeig de Gracia and the Expansion Plan site have a slope of 6%; this inclination gets less dramatic as it approaches the sea. Laterally, the city is defined by two rivers: Llobregat and Besós, located roughly parallel, and distanced fourteen kilometers (approximately nine miles) from each other. Due to the steep slope, the streams that came down towards the sea had very continuous and homogeneous riverbeds, not very deep and even

dried up. Many of these streams transformed into pedestrian roads, resulting in vertical roads that connect the outskirts towns with the walled city. The inclination of the city towards the sea has produced a great number of vertical roads; contrarily, there are almost nonexistent horizontal roads. This was the origin of Passeig de Gracia, usually known as the *Cami de Jesus*, which has had diverse transformations over the years due to its central position in the city. The first official construction of Passeig de Gracia took place in 1821. With a length of 1,400 meters (approximately 0.8 miles) and a width of 40 meters (132 ft), the trace of the six lanes was dictated by the trees. Ever since, the avenue, regarded by Allan Jacobs as one of the world's "great streets"³⁵ has been considered majestic. Although this thesis will not treat the evolution of Passeig de Gracia in detail, what is relevant for this study is that the boulevard began as a stream that dried up and became a pedestrian road. Eventually, this road connected the old city with one of the leading outskirts towns, Gracia.

It is also important to mention that the existence of nearby rural land, and the reason why the outskirts towns began to only slowly develop was due not only to the wall as a physical obstacle, but also because of the legal

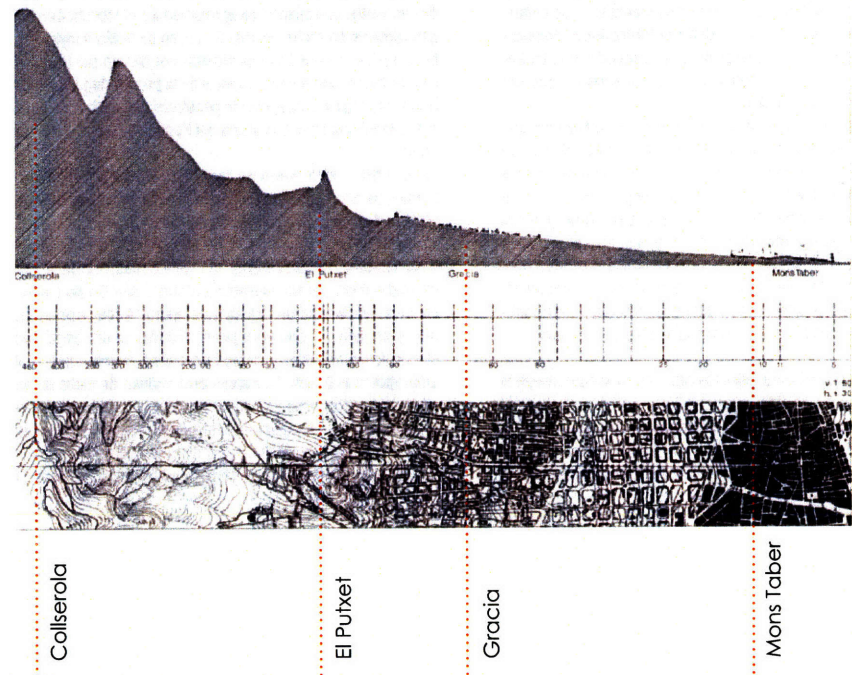


Fig. 37 shows a section of the Barcelona plain, and how the inclination drastically decreases as it approaches the sea.

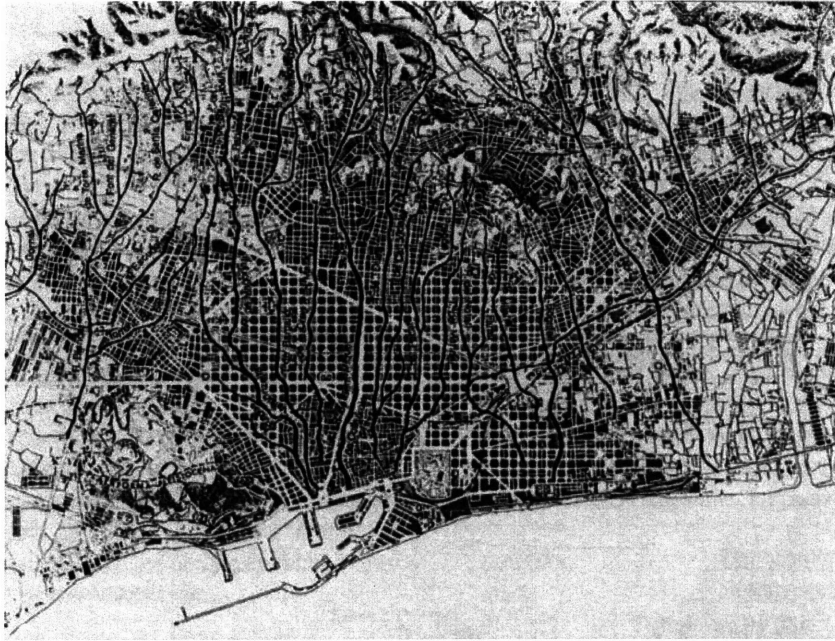


Fig. 38 shows the hydrograph of the city and how many of the existing roads were originally part of this vertical mountain-sea system.

prohibition of construction within a 1.25 kilometer (.78 miles) radius of the walled city, as a political way to prevent revolts. Until the 1830's the space between the old city and Gracia was just a road through grassland. Eventually, the use of the road was enough that activities began to take place along it, and a design was soon required.

Clearly, the idea of having open spaces, avenues, and well designed infrastructure outside the wall was important for the Catalans, who were experiencing early industrialization and wanted to be at the level of other European cities. This idea of designing open spaces contrasted with the intramural conditions, another astonishing fact about the history of the urban development of the city of Barcelona. Also in this period, theaters, boulevards, and gardens began to gain popularity among citizens.

Inside the walled city, the most popular boulevard was the Ramblas, also once a dry stream. The natural irregular trace of the Ramblas, once followed by the wall, was given by the Llobregat River. The Ramblas was the first planned urban space, a tree-lined avenue that ran –and still runs– from the (once) rural open area to the Mediterranean Sea, and that once separated the old and the new village. Outside the walled city, a number

of paseos or boulevards were designed. Among the most significant were: a) Paseo San Juan, modestly designed with benches and street lamps; b) Paseo del Cementerio, whose main attraction was the view of the first railroad that ran along its way; and c) Paseo de la Barceloneta, a 500-meter long (1,640 ft) boulevard between two lanes of trees. Passeig de Gracia was not an axis with activities along its way only. This fact is relevant because, as mentioned before, the site for the Eixample was many times considered as an empty terrain or a "rural site". Along this boulevard, which was the most visited due to the activities and the number of people that frequented it, several gardens were designed.³⁶ The main wall doors, which were often closed at night, began to be opened more often for people to enjoy the outside life. As previously mentioned, this was a period (1850) with a strong interest in designing the open space, especially gardens. These gardens, like any business, had the peculiarity of being popular for a limited time, even though almost all of these gardens were open for free to the public.

The most visited were los Jardines de Passeig de Gracia, due to their proximity to the paseo and los Campos Eliseos, an eight-hectare garden, designed in 1853 by José Oriol Mestres. These gardens were significant for several reasons. First of all, the main attraction of the garden was a roller coaster, an element that stood out against the skyline of the valley. Secondly, these were the first gardens that established fee-based entry. Los jardines de Euterpe were designed in 1852 as a space for Josep Anselm Clavé to present his choirs, and finally, the Jardín de Tivoli, which was originally located along Passeig de Gracia, and provided 1.5 hectares of open space for public activities.



50 Fig. 39: the old city and the outskirt towns between the two rivers.

These gardens, as well as other smaller ones began to diminish with the construction of civic buildings like the Plaza de toros and the Odeón Theater. With the development of the construction of the Eixample in 1860, the rapid spread of buildings forced these gardens to shrink and, eventually, disappear.

The Eixample site covers approximately 1,102 hectares, distributed among the following municipalities: Barcelona, with 527 hectares; St. Marti, with 423 hectares; Gracia, with 101 hectares; and Les Corts, with 51 hectares. The bulk of the terrain was divided into 479 parcels that were mainly privately owned. As mentioned before, the idea of having an Extension project had existed since 1850, when deeds for the land were also beginning to be processed. In 1860, with the approval of a winning Extension proposal, land transactions increased and accelerated.³⁷ Through this complex process the city council and developers intended to obtain as much capital from the land and taxes.



Fig. 40 shows the roller coaster, one of the park's major attractions.

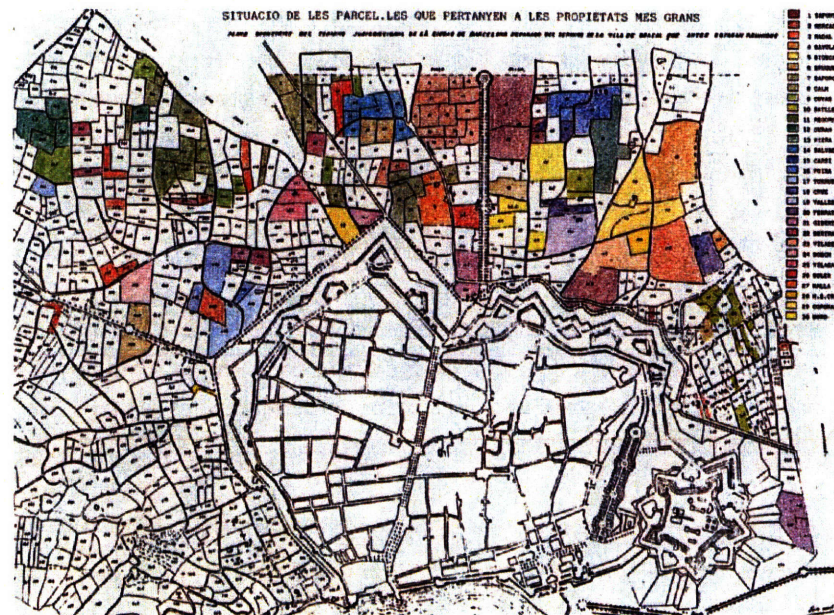


Fig. 41 shows the way the land was parceled. The colors establish a relationship between the land and their ownerships, which in this case are primarily private properties.

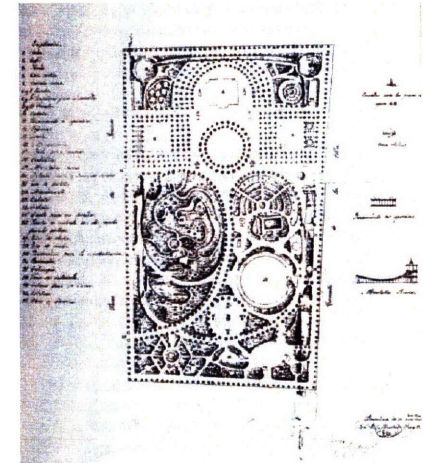


Fig. 42 shows the project for the Campos Eliseos Garden, designed in 1852 by J.O. Mestres. This park was the first one to establish an entrance fee in order to support maintenance.

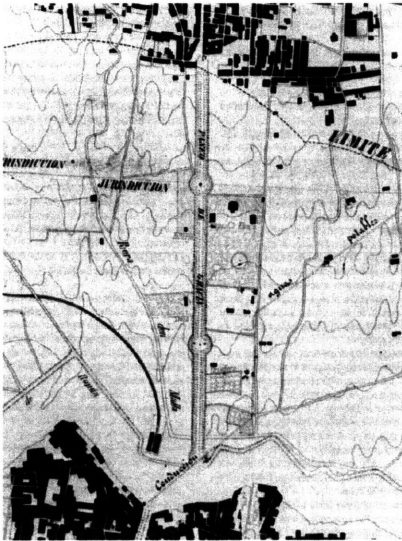


Fig. 43 shows a study made in 1855 by Cerdà that shows the Passeig de Gràcia as well as some of the existing Parks.

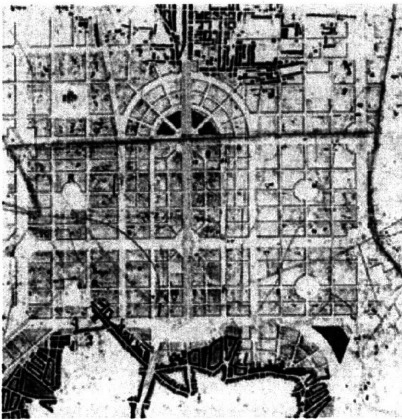


Fig. 44 Miguel Garriga y Roca's schematic design for the competition.

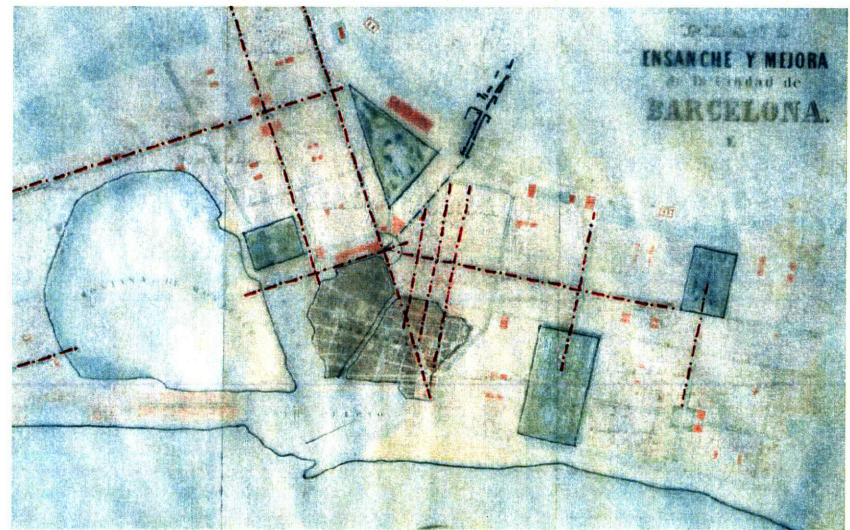
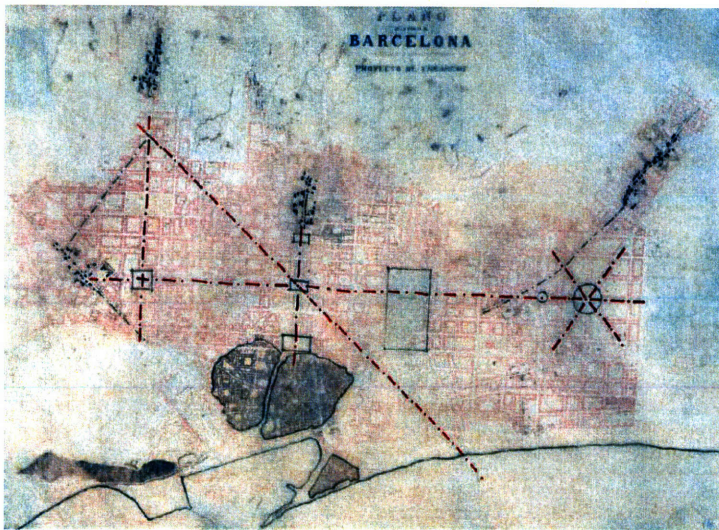
3.2 The 1859 competition

This thesis will broadly analyze four projects (out of the 14 that were presented), including the winning one. As previously mentioned, there are many different ways to perceive, not only the winning (Cerdà's) project, but also the other projects that entered the competition.

Some projects proposed a continuation of the old city. Although some of these projects proposed modifications in the old city, they were considered as an expansion of the Roman city. The more "aggressive" projects, the ones that proposed a more radical and innovative idea of a city that would form a new metropolis in the rural "empty" site, even though there were activities, parks, and open spaces along the site, left behind the layout of the old city, which they believed had no functional values and was not part of the "Modern World" and the "urbanity propaganda."

Passeig de Gràcia, as a key linking element in the urban development of the city, was treated differently. In some projects it was treated as a hierarchical element, in others integrated into the project, and in others even dismissed. This gesture represents and contains a very deep idea for the "new city"; it is in many cases, the one that reveals the agenda behind the plan. Garriga's proposal, for example, presented a hierarchical plan, where social differences were intended to be physically shown by locating the bourgeoisie class along the Passeig de Gràcia axis, while the working class was located in the periphery of the plan.

Fontseré's project also presented a hierarchical plan, following the Academy's (Haussmann's) classical model, using axes, nodes, and points of convergence. Presenting an even larger block scale than Cerdà, he enlarged Passeig de Gràcia's width from its original size (40 meters – 132 ft), and located three large plazas along its way, with a relative large park on the East side, close to where the Campos Eliseos used to be. The project considered diagonal roads as a way to connect different zones. Most important of all, these diagonals served as axis to connect the outskirts towns among each other.

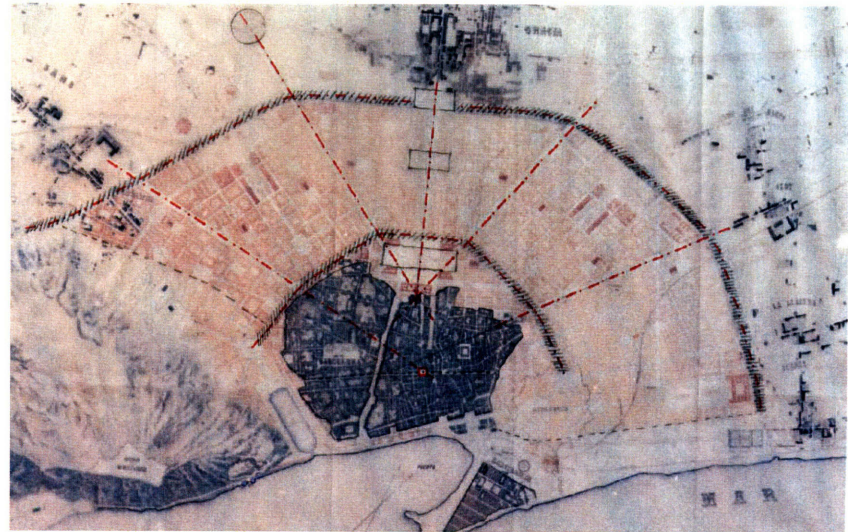


Figs. 45 and 46: Fontserre's project, showing the diagonal road that ran from Sarría to the Mediterranean Sea.

Figs. 47 and 48: Soler i Gloria's project.

Soler i Gloria also used the diagonal as a connector. His project was the one that took the old city more into account, by introducing a diagonal road that crossed the old city, from the existing Plaza del Palacio, in the South East side of the city, all the way to the outskirts town of Sarrià. The orientation of this axis was followed on the west side of the plan, which surrounded Montjuic and covered a very large area. Another reticular, simpler grid was proposed in the East side of the Ramblas, and extended in the Eixample proposed plan, where Passeig de Gracia was totally dismissed from the actual terrain; on the contrary, the idea of having parks along the site, remained.

Rovira i Trias' project also followed the Academy's classical model, with a hierarchical structure. Rovira's project, considered as an "Extension plan," also enlarged the Passeig de Gracia, even more than Fontseré, and also located three large plazas along its way, being the Foro de Isabel II the largest, situated where the place Plaza Catalunya is today. The organization was based in a fan-shaped boulevard that surrounded the walled city, taking into account the old city as the node from where different radial axes were born (see image 51 to see how one of the axis crosses right into the center of plaza Sant Jaume.) This axes divided the city's extension in five, with a canal and a railroad that delimited the plan.



Figs. 49 and 50: Rovira i Trias' project, the project that was first announced as the winning project.

Cerdá's project was not very well received, and even considered as an "irremediably monotonous plan."³⁸ What made Cerdá's proposal substantially more different than the others was that his did not present a "Haussmannian," romantic city with monuments. He evoked critical reactions by proposing, in contrast, liberal—and controversial—ideas for the city of Barcelona. Cerdá intended to create with his project the new "heart" of the city, with an undifferentiated fabric of blocks that could continue expanding. This had not only a physical, but also a social explanation that will be explained further on. For the contest proposal, Cerdá presented a project where Passeig de Gracia was incorporated, respecting its original width, which later on was enlarged to today's width (60 meters or 200 ft). The project covered the area which linked the old city with the outskirts towns of Sans, Les Corts, Sarrià, San Gervasi, Gracia, Horta, San Andres de Palomar, and San Martín de Provensals.

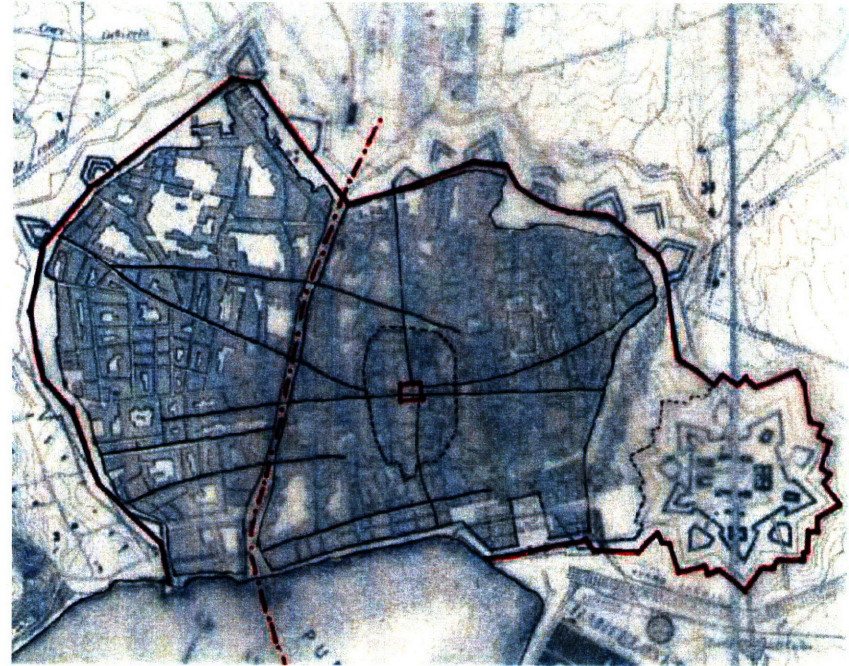
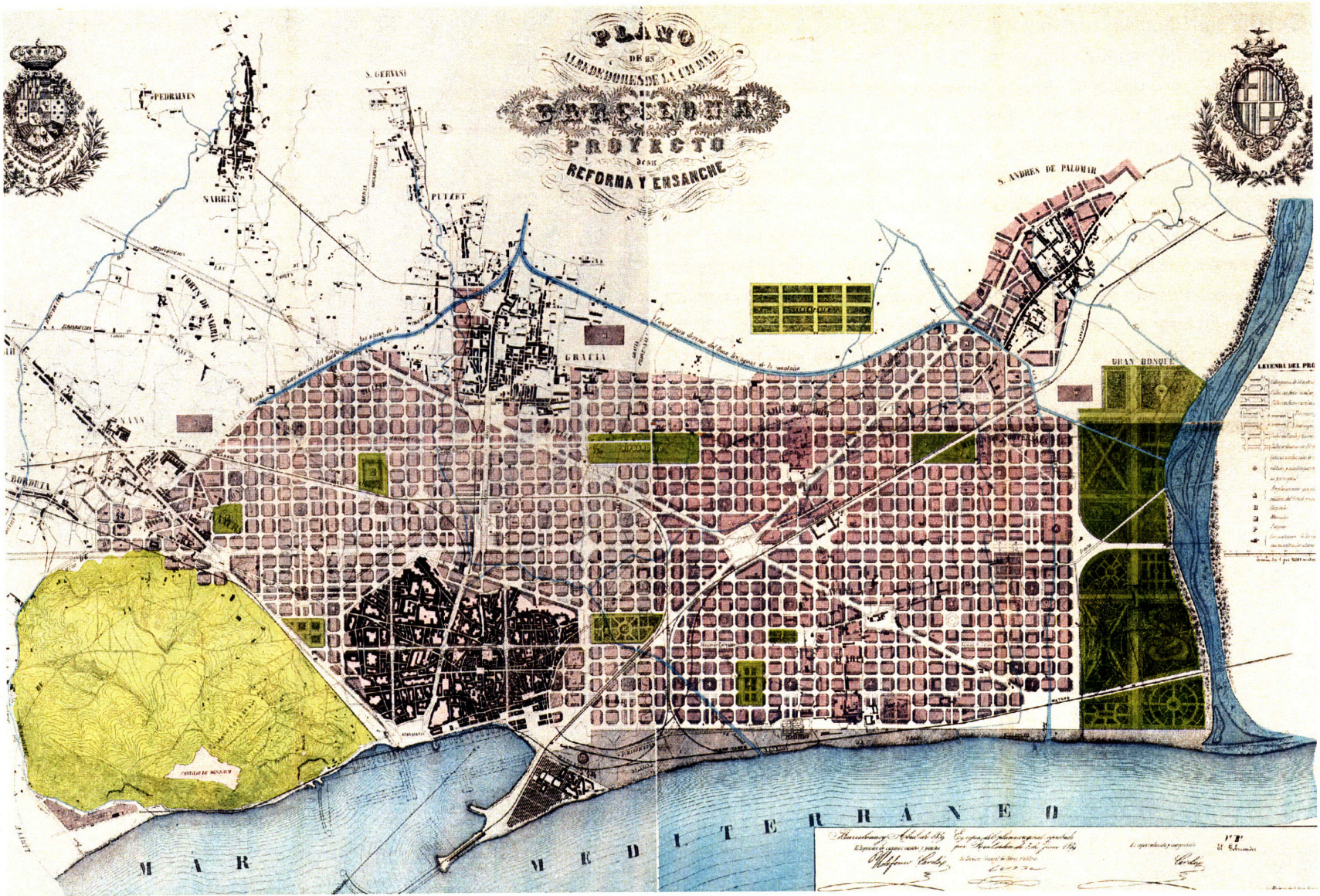
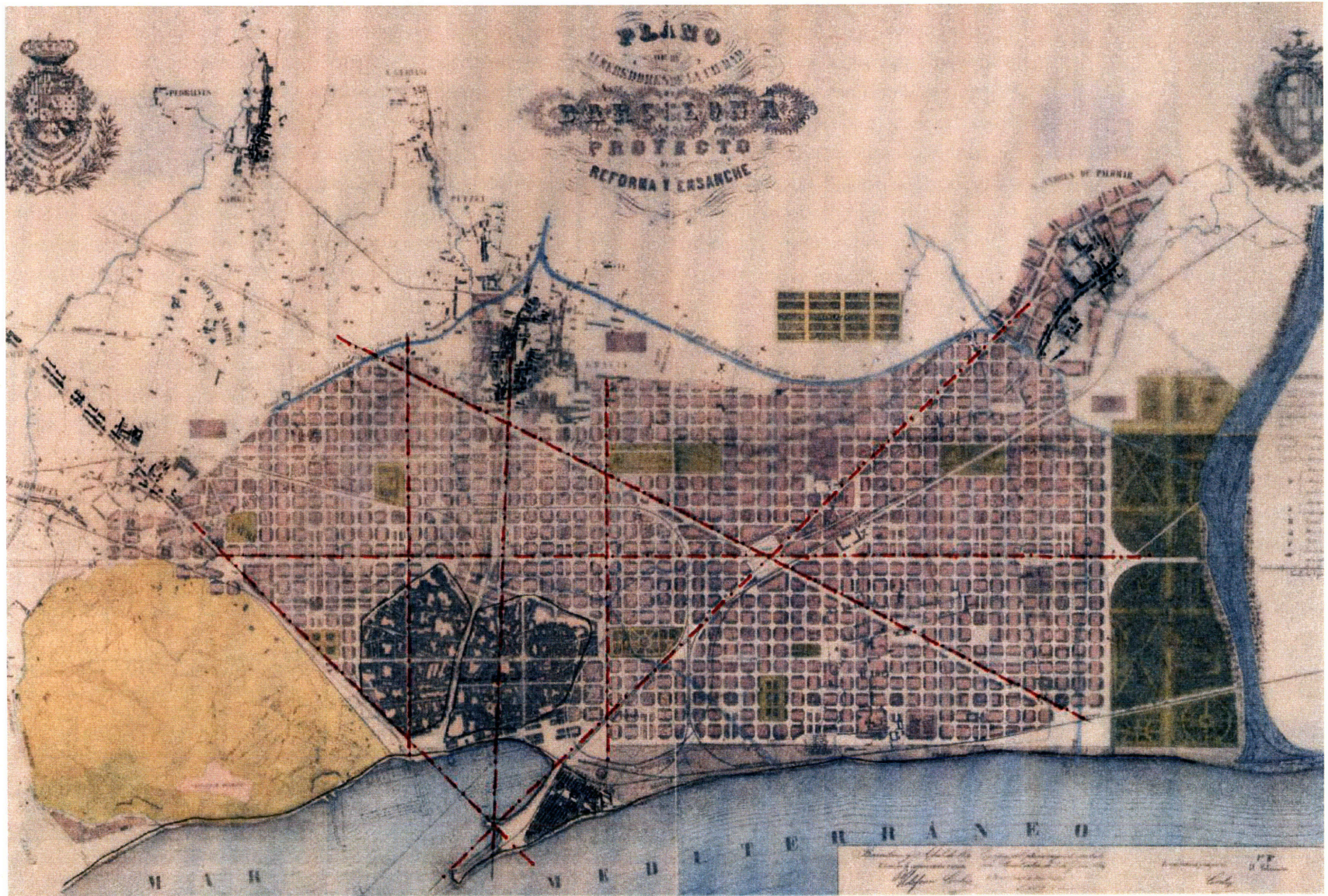


Fig. 51: The contour of the wall, the trace of the Roman city and the main roads and axis inside it.





Figs. 52 and 53: After cancelling Rovira's triumph, Cerda's competition project was elected as the winning proposal.

"Urbanistically" speaking, the main roads he proposed were: a) three diagonal roads, one that used to run from Sarrià to the Mediterranean Sea, a second one that ran from San Andres del Palomar to the Barceloneta, and a third one that connected Sans with the sea b) two roads that ran in the mountain-sea direction: Passeig San Juan, a 50-meter width road and the Urgell road, a narrower road –30-meter width,-- which crosses the old city all the way to the Mediterranean Sea; and c) The Gran Via, which ran in a parallel way to the sea, was the central axis and connected the city in an horizontal way. The rest of the grid was formed by 20-meter roads. Although the project included a railroad proposal, it presented an advanced circulation steam machine system, for which Cerdá proposed that every block had a chamfered corner –cut in a forty-five degree angle-- in order to facilitate movement throughout the city. For Cerdá, circulation was a key structural element in his proposal. The origin of the layout, as well as characteristics of the project, will be explained in more detail in the following chapter.

In order to understand the construction development of the project, it is important to briefly mention the different constituents and rules of the competition. First of all, the contest was a complex procedure, with a significant number of different political and social issues that involved many people and interests. This study will neither cover the complex political and social rationale of this decision but an important fact to know is, however, that a difficult confrontation between architects and engineers emerged as a result. An example of this is that when

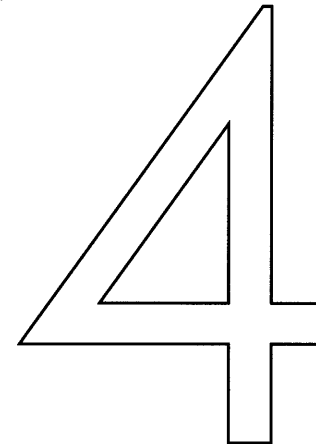
contestants presented their projects, Cerdá, being an engineer, presented his project in a separate room. Also, in November of 1859, the City Council of Barcelona announced the winner, the Catalan architect Antoni Rovira i Trias; and in June of the next year, the Madrid government intervened and announced the approval of the engineer Idelfonso Cerda's plan, cancelling Rovira's previous triumph.

There are different opinions of why Cerdá was awarded the mandate. The most controversial and mostly heard at that time in Barcelona was that Cerdá had good and powerful engineer friends in Madrid. This study infers that the reason the Central government chose Cerdá's plan was because they valued the quality of the plan, and most of all, because Cerdá presented much more than a mere aesthetic project: his was an innovative and complete proposal that even included an economical proposal. Furthermore, his project, based on progress and socialist theories, carried along a powerful future-oriented vision for the city and society of Barcelona.

4. IDELFONSO CERDA'S PLAN

Mr. Cerda was liberal and talented, two circumstances which are harmful in Spain and tend to create many enemies. (...) He had a great love for the country in which he was born. (...) Barcelona, however, has not named any of its streets after Cerda, nor has it even dedicated any inscription to him; but it doesn't matter. Mr. Cerda erected his own monument, the Extension plan –a timeless memorial, superior to any others that his fellow citizens might dedicate to him.

La imprenta newspaper, Barcelona, August 1876.



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As mentioned in the previous chapter, Cerdá's plan was considered not only controversial but also monotonous. The competition created a confrontation between architects and engineers: architects attacked Cerdá's plan by saying that he was presenting an empty plan that lacked artistic content. Cerdá defended himself by arguing that architects were only concerned about the aesthetic aspect of the plan, arranging the elements in an arbitrary way, without presenting a strong concept behind the physical intention. He charged that they did not explain how they were going to solve the hygiene and traffic crisis that the present-day city was encountering; they were ignoring the true necessities of the "new city."

Public opinion, as commonly heard in the streets, considered Cerdá an outsider due to his close relationship with the Madrid government, at the same time that he was strongly connected to Barcelona's downtrodden. He did have a strong influence with the central government, but his deepest interest was in the working class.

He also had an active political life in Barcelona, and further, an intense connection with a group of liberals. All these relationships and interests made for a complex, interesting man not easy to accept in the 1850's, a successful but socially fragile decade in the history of Barcelona.

Before describing Cerdá's project, it is worth while to point out that his "Teoría General de la Urbanización," published in 1858, was a general treatise --as its name implies-- including statistics, historical explanations, examples, theoretical principles, and intentions. Based on his "Teoría General de la Urbanización" Cerdá elaborated his "Teoría de la construcción de las ciudades aplicada al proyecto de reforma y ensanche de Barcelona," describing its specific conditions and proposals. This work, finished in 1859, was submitted for the competition as an adjunct document together with the drawings. His "Teoría de la construcción de las ciudades aplicada al proyecto de reforma y ensanche de Barcelona"³⁹ had two main sections: analytical and synthetic.

The analytical section presented, as an introduction, a historical account of the closed city, including the challenging phase of tearing down the walls. Afterward, and as the most detailed part of his treatise, Cerdá described the industrial city of Barcelona, with an analysis of the statistics. This part included a meticulous description and topography of the city, not only of the walled city but also of the outskirt towns. It included as well the density studies and descriptions of different physical housing conditions and components (e.g., patios, toilets, piping), programmatic distribution, storage, and construction costs. This statistics section also contained the detailed population census, which included a comparison between different censuses (in order to see the density growth) and diverse working class statistics such as death rates. This statistics section ended by summarizing the

the conditions of the industrial city, arguing the need for an expansion. Furthermore, the analytical part of his treatise included an appendix with the most commonly used construction materials.

The synthetic section included Cerdá's theories based on the studies and statistics for the specific city of Barcelona –shown in the analytical section—and used for the Expansion project. These theories were divided in five chapters. The first one contained theories about air, ventilation, light, and water, and the way these basic elements should be taken into account for a city design. The second chapter talked about how the configuration of a site –its structure, temperature and general properties-- should be studied for the foundation of a new city. The third chapter included a description of the housing project, such as the programmatic area, drainage and garbage systems, stairs, heights, and construction costs. The fourth was a short chapter that mostly described the characteristics of patios, describing their vital necessity. The last and most detailed chapter included a description of the special (civic) buildings, blocks (types, shapes, and sizes), parks, streets, plazas, and drainage system.

This chapter will describe Cerdá's proposal for the Eixample, based in the studies and theories written in his "Teoría de la construcción de las ciudades aplicada al proyecto de reforma y ensanche de Barcelona." It will speculate as to how his theories connect to the different influences he was exposed to and to his census and studies. It will also briefly describe how he participated in the development of the Eixample construction and how he dealt with the different forces, intentions, and changes that impeded the progress of the original plan.

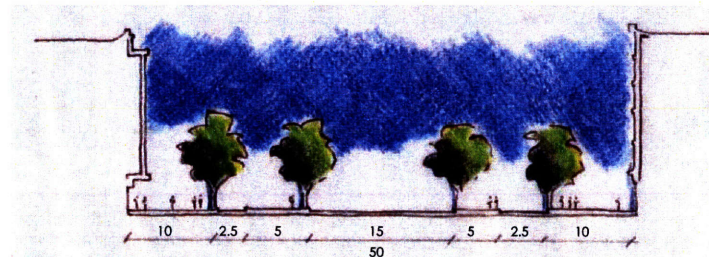
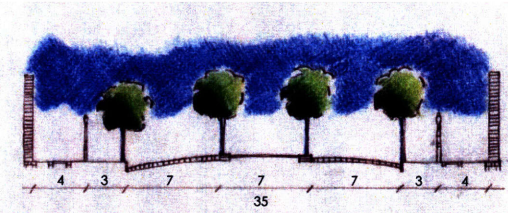
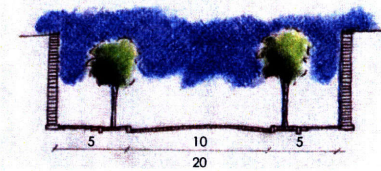
4 IDELFONSO CERDA'S PLAN

4.1 Cerdá's egalitarian plan

From a conceptual point of view, we may infer that Cerdá was influenced by the utopian socialist thinkers to create a plan formed by a grid of equal repeating elements, it being imperative to avoid hierarchies. The only hierarchy he clearly intended was the design for streets, as part of his argument for the necessity of creating a circulation system. Cerdá witnessed the difficulties that the narrow streets in the old city caused, not only for carriages and the pedestrian traffic, but also for air circulation. As a solution, Cerdá proposed a more open circulation system in which he based deliberately on creating a homogeneous grid in order to generate a democratic plan, without giving more importance to some land properties. This socially progressive idea of elevating mobility shows Cerdá's engineering and technical mind.

Nevertheless, three types of street widths were suggested in order to create a highly efficient system: type one was 20 meters (65 ft) wide and was the one that mainly formed the structure. Type two was 35 meters (114 ft) wide and was for streets that, due to their position on the plan and in the city, would have more vehicular and pedestrian traffic. The last type of street was 50 meters (164 ft) wide. The last two were meant to be high-speed connectors that would link the outskirt towns with the old city, the parallel rivers, and the port, covering the city in both an orthogonal and diagonal way.

The idea of creating different types of streets was to provide different types of flows, to connect the city in different dimensions. In order to connect the city with its surrounding areas, and following the Roman trace orientation, Cerdá proposed a diagonal road (Diagonal), two forty-five-degree angle roads (Parallel and Meridiana), and three orthogonal roads besides Passeig de Gracia⁴⁰ (Urgell, Sant Joan, and Gran Via). According to Cerdá, the port had historically been the spirit of the city of Barcelona. Therefore, it was important to create a skeleton that would incorporate the port in the new city. Also to integrate the old city with the new proj



Figs. 54, 55, and 56: sections of three of the different streets types proposed by Cerdá. Fig. 56 shows Passeig de Gracia which was meant to keep its original width but was modified to 60 meters or 200 ft wide.

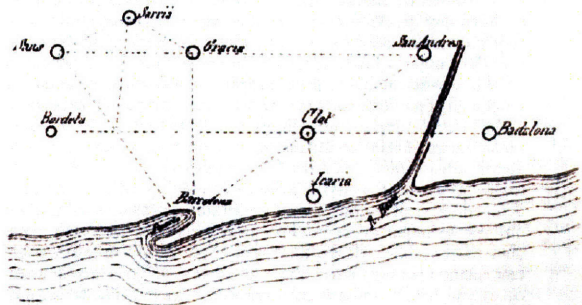
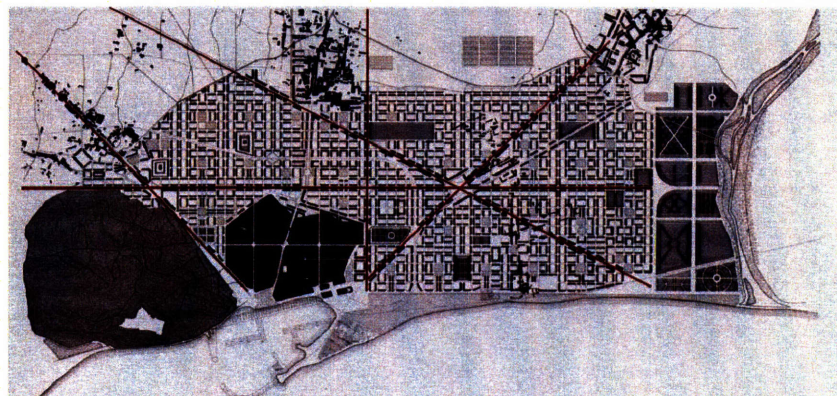
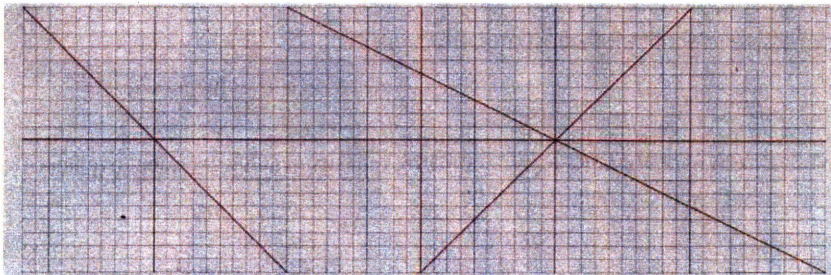


Fig. 57: Cerdá's diagram for connector-roads, which link the city with the outskirts towns and surrounding areas, the port, and the sea.



Figs. 58 and 59 show the origin of Cerdá's layout for the grid and the roads. Fig. 58 shows a diagram of the Eixample area, divided into three identical squares. Two 45-degree diagonals show the origins of Parallel and Meridiana streets. The third diagonal showing is Diagonal Avenue, formerly named Franco avenue. All of these roads have Gran Vía street as their horizontal axis.

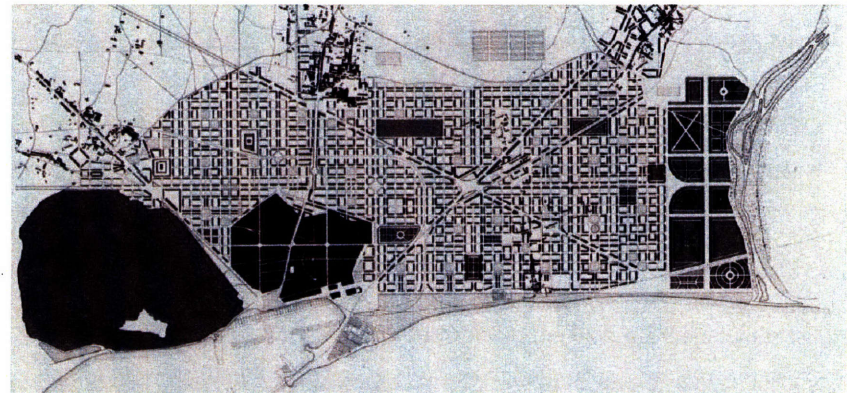
ect, Cerdá proposed to build a path around it—wider than the inner city streets—, together with a ring of tracks as part of the railway system. This would link the existing railway stations with Barcelona and its port.⁴¹The layout of the streets, as mentioned before, served two types of circulation systems: people's movement and air circulation. According to Cerdá's studies, the narrow streets, together with the conditions of the houses in which people lived, gave a dreadful result. Not even the bourgeois class was living in proper conditions, having only an average of 3.60 cubic meters of atmospheric air, per person, per hour. According to Cerdá, ideally every human being should have a volume of at least 6 cubic meters per hour of recycled air. These conditions also involved the terrible state (or absence) of patios and the lack of open areas (parks and plazas).

In order to address this whole set of problems, Cerdá proposed that his plan would be formed by blocks with only 50% of their plot ratio constructed, living the other 50% for a central patio or garden. The original idea was that these gardens would be open to the public, following his idea of "ruralize the urban and urbanize the rural." Cerdá realized that the idea of having courtyards that would function as plazas, or gardens that would function as public parks, not only provided public open spaces but it also lowered the population density.

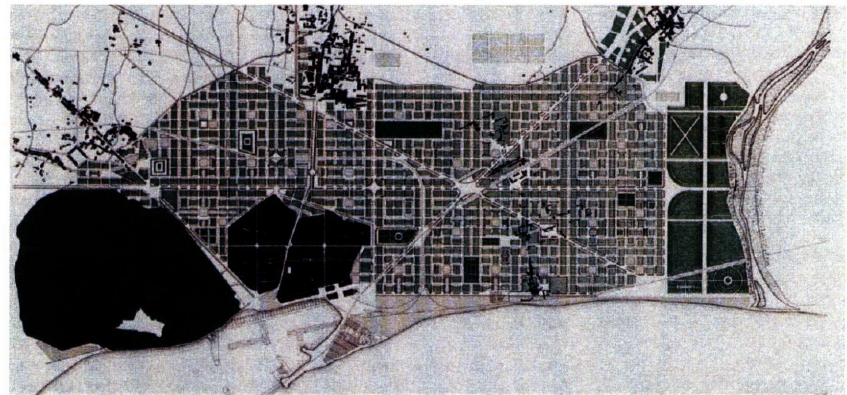
The layout of the streets, as mentioned before, served two types of circulation systems: people's movement and air circulation. According to Cerdá's studies, the narrow streets, together with the conditions of the houses in which people lived, gave a dreadful result. Not even the bourgeois class was living in proper conditions, having only an average of 3.60 cubic meters of atmospheric air, per person, per hour. According to Cerdá, ideally every human being should have a volume of at least 6 cubic meters per hour of recycled air. These conditions also involved the terrible state (or absence) of patios and the lack of open areas (parks and plazas).

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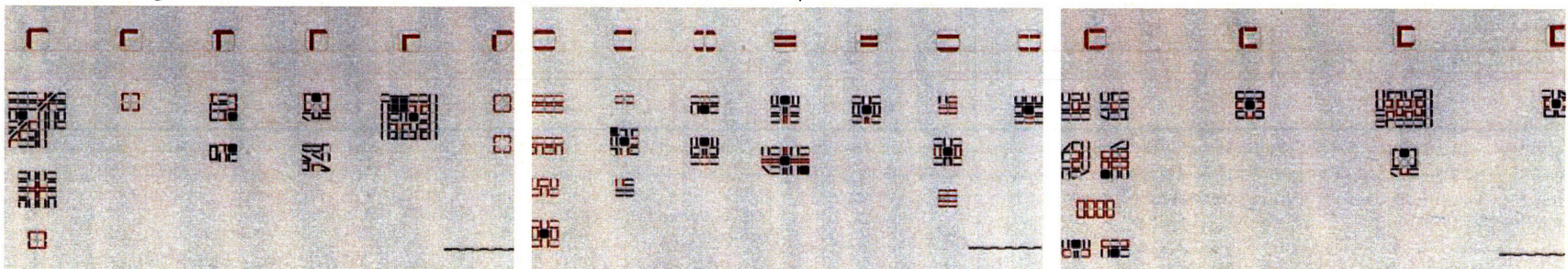
Cerdá suggested three different types (layouts) of blocks: building blocks forming an (almost always) 90-degree angle, two parallel lines, or a "u" shape. No matter the combination, these blocks were conceived as having detached housing in a 20 x 20 meter parcel with a maximum of four storeys or 16 meters height,⁴² following the standard requirement of air mentioned before. The types of blocks, their distribution in the plan, and the development of the "block" is a complex subject beyond the scope of this thesis.⁴³ What is relevant to know is that the arrangement of the blocks was not randomly decided. Besides studying the orientation of each block, Cerdá intended to create subtle but clear boundaries in order to create neighborhoods within the larger plan.⁴⁴ In order to plan the program, he used his studies as a base to determine the necessities of the population in relationship to civic centers. Cerdá's idea was to develop a residential fabric, organizing the neighborhoods previously mentioned so that those neighborhoods would count with the main administrative and



Figs. 60 and 61 show Cerdá's proposal, comparing the construction areas with the green areas.



Figs. 62, 63, and 64 show the different types of blocks that Cerdá originally proposed.



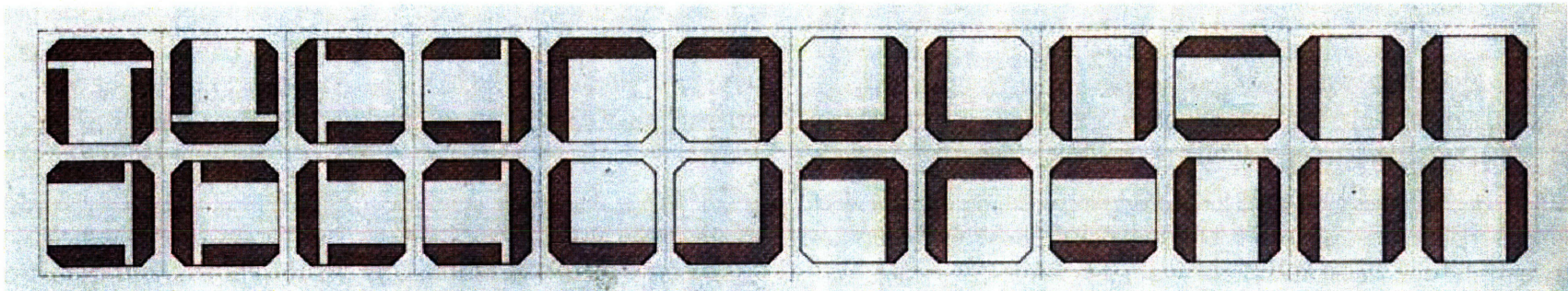
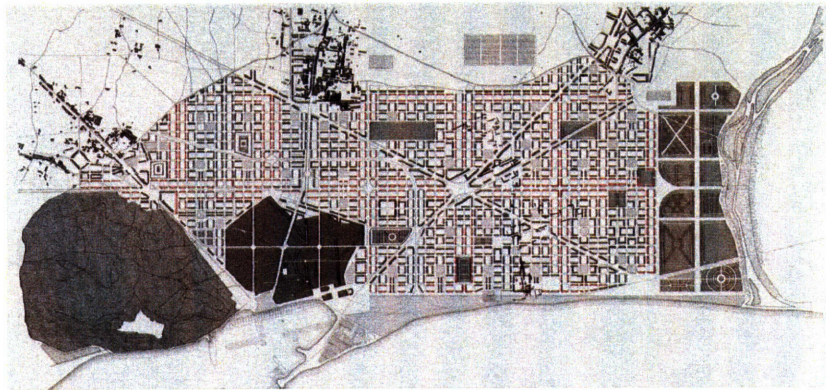
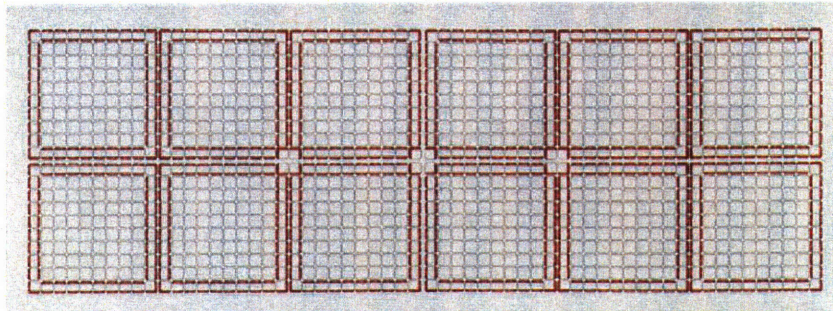


Fig. 65 shows the three different block types. See image 69 to see how these blocks were distributed in the plan.



Figs. 66 and 67: Cerdá's plan intended to create different neighborhoods within the city. We may infer that the size of these neighborhoods comes from the three squares diagram.

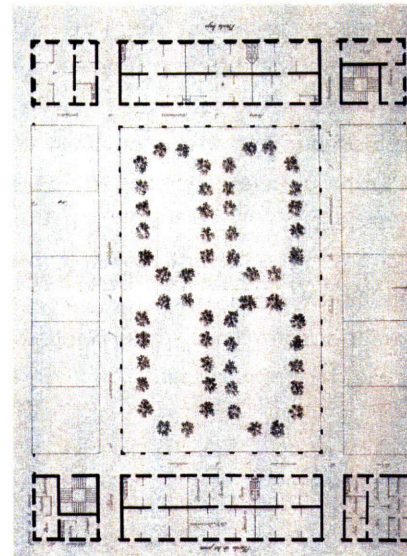


Fig. 68 shows the "two lines in parallel" block type, the plan distribution, and the construction area versus the courtyard area.

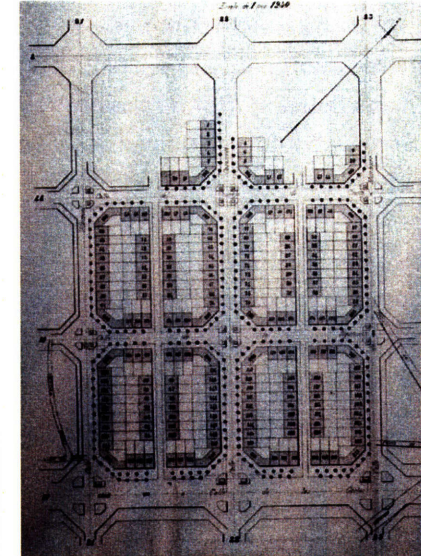


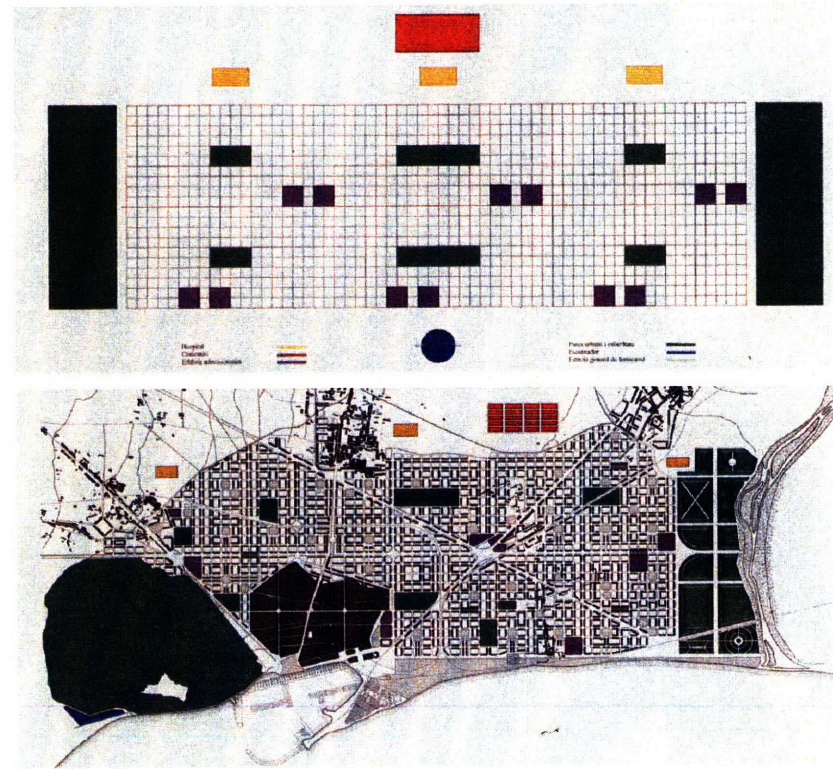
Fig. 69. explains how the "u block" type was organized with other equivalent blocks.

civic centers, also homogenously distributed; larger buildings or areas such as hospitals and cemeteries would be in the periphery of the city. In order to decide where these civic centers would be located, he studied the distance between each building and the number of people who would be making use of it.⁴⁵ We can infer that Etienne Cabet, with his "ideal society," influenced him in this idea.

Knowing the origin of the size of the block is also relevant. **Cerdá argued that having a grid solved many issues concerned with construction, legal matters, administration, topology, and traffic, among others. That is why he studied "the perfect block size" for his grid.**

Knowing the origin of the size of the block is also relevant. Cerdá argued that having a grid solved many issues concerned with construction, legal matters, administration, topology, and traffic, among others. That is why he studied "the perfect block size" for his grid, from which many different theories arise. This study supports the idea that the origin of the block size lies in Cerdá's primary studies and his conclusion about the necessity of designing a house or "basic cell." Albert Serratosa, who participated in the exhibition "Mostra Cerdá, Urbs i territory", held in Barcelona from 1994 to 1995 as a way to commemorate a discovery made in the Alcalá de Henares Archives, supports this theory. Serratosa says that for Cerdá, affordable (referring to the working class) housing was the starting point to approach the design of a new city. That housing would need to be spacious enough and provide privacy, ventilation, and sunlight. Salvador Tarragó and Francesc Magrinyà, who also participated in the exhibition, agree on this theory, and talk about the formula that arose from it, which always took into account his ideas on housing.

The foundation of the formula, which gave as a result the block size (113 meters or 370 feet) was the relationship of the number of inhabitants per dwelling, plot size, volume of air needed per inhabitants, and street width. As a result, the whole plan (with slight alterations) becomes a grid made by 113-meter-long blocks. Also as part of the design of the block, as a solution for the circulation problems Cerdá found in the old city, and as a



Figs. 70 and 71 show Cerdá's diagrammatic program: green area symbolize the larger green spaces, the purple symbolize the administrative areas, the yellow the hospitals and the red the cemetery.

$$x = \frac{pv - 2bd}{d} \pm \sqrt{\frac{pv}{d^2f} (pvf - 4bdf - 4b^2d)}$$

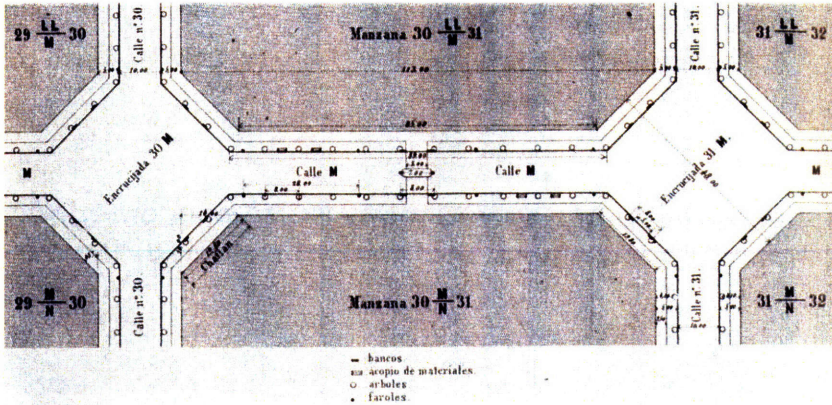


Fig. 72 explains the street-width in relationship to the chamfered corners. It also shows how Cerdá submitted an extremely detailed plan; in this figure, the location of benches, streetlamps, and trees is shown.

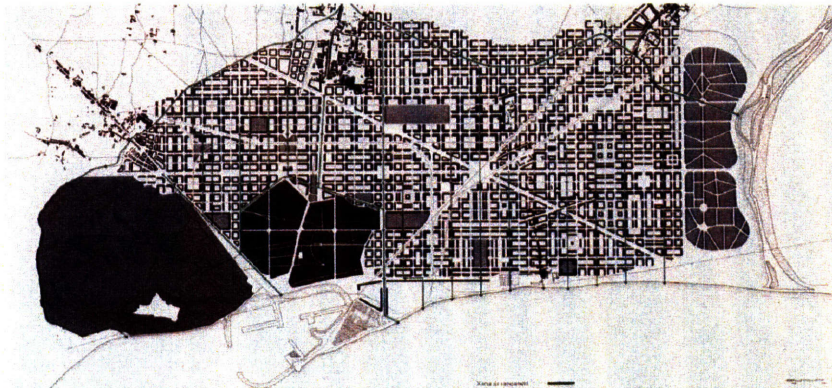


Fig. 73 shows Cerdá's proposal for the sewage system, overlaid in the 1859 plan.

way of adapting to the industrial era, he proposed to have 20-meter-long chamfered corners, cut in 45 degrees, to facilitate the steam machine circulation system. The idea of having a system that would travel throughout the city was extremely advanced for those days. What this chamfered corners produce today, both in the pedestrian and vehicular scale, will be further analyzed in the following chapter.

Before analyzing another aspect of Cerdá's proposal, and related to the previous one, it is essential to understand that although Cerdá's proposal is formed by the arrangement of detailed and analyzed components, he did not think of them as isolated elements, but as a system. Therefore, while considering the size and type of blocks, he was simultaneously solving, for example, the sewage system.

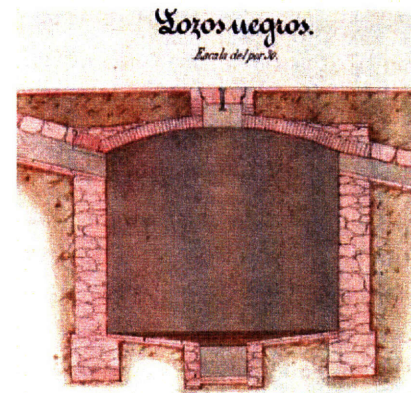
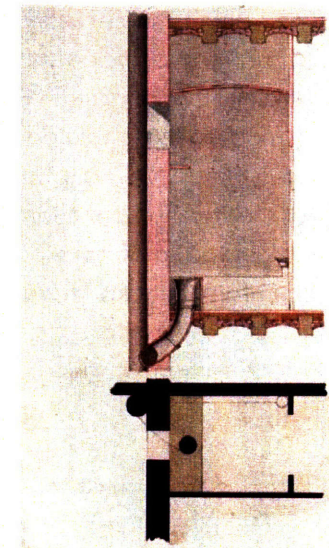


Fig. 74 and 75 show pipe details, submitted as part of the sewage system.



Taking the sewage system as example, and taking into account that according to Cerdá's studies, the lack of a well designed sewage system caused serious hygiene problems, and for this reason, it was imperative for him to propose a solution, we can say it is one of the most impressive aspects of Cerdá's proposal by the detailed way he presented it. Due to the scale and magnitude of the project, he submitted a schematic design without finishing the executive project, but presenting various solutions for the pipe cross sections. In order to complete the sewage system, the engineer García Faria polished Cerdá's original theories. In a way, thanks to Garcia Faria's vision and reorganization of the drainage system, a magnificent recycling system was built: the rain water was purified for recycling purposes and the waste water were taken and re-used in the Delta River as fertilizer.

In fact, **even though Cerdá submitted an extremely detailed project, it is essential to understand that his intention was to set the basis of the different components –drainage, circulation, housing-- for the design of a new city, and that these elements could be understood as an organism.** Cerdá argued that cities were made up of various functional, ideological, and formal elements, where these different elements get influenced at the same time as they exert influence in others. In Cerdá's opinion, these factors were what gave unity in cities, creating a system. It is probable that Cerdá was influenced by Cuvier and his *Lecons d'anatomie comparé*.

Surprisingly, Cerdá's intention was to not only set the basis for a specific city but, on the contrary, his goal was to develop a theory that could be applied in "any new (industrial) city." This is why Cerdá is known as the man directly responsible for the Eixample of Barcelona and the indirectly responsible for other "Ensanches" (meaning Eixample or extension in Spanish) of many other Spanish cities in the second half of the nineteenth century and the first half of the twentieth century such as Madrid, Valencia, and Bilbao where his principles were applied.⁴⁶

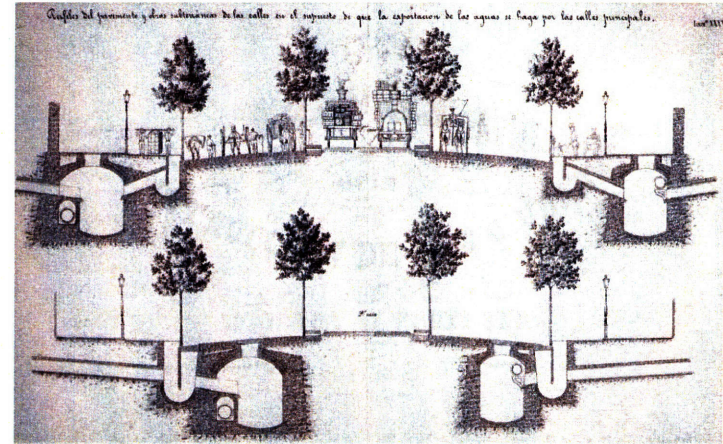


Fig. 76: section of the sewage proposal.

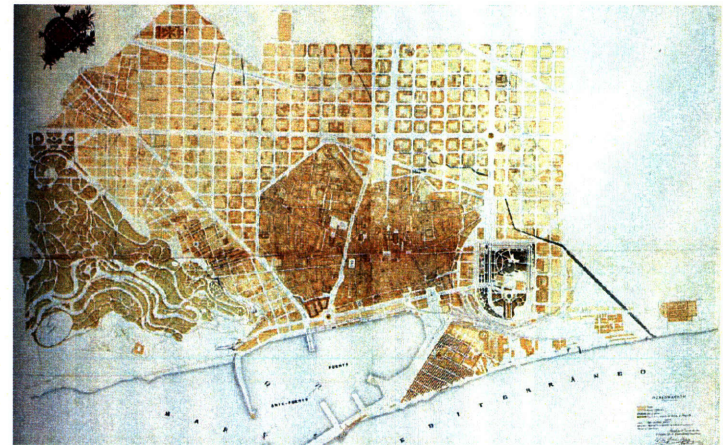


Fig. 77: García Faria's sewage system plan, which followed and materialized Cerdá's original intentions.

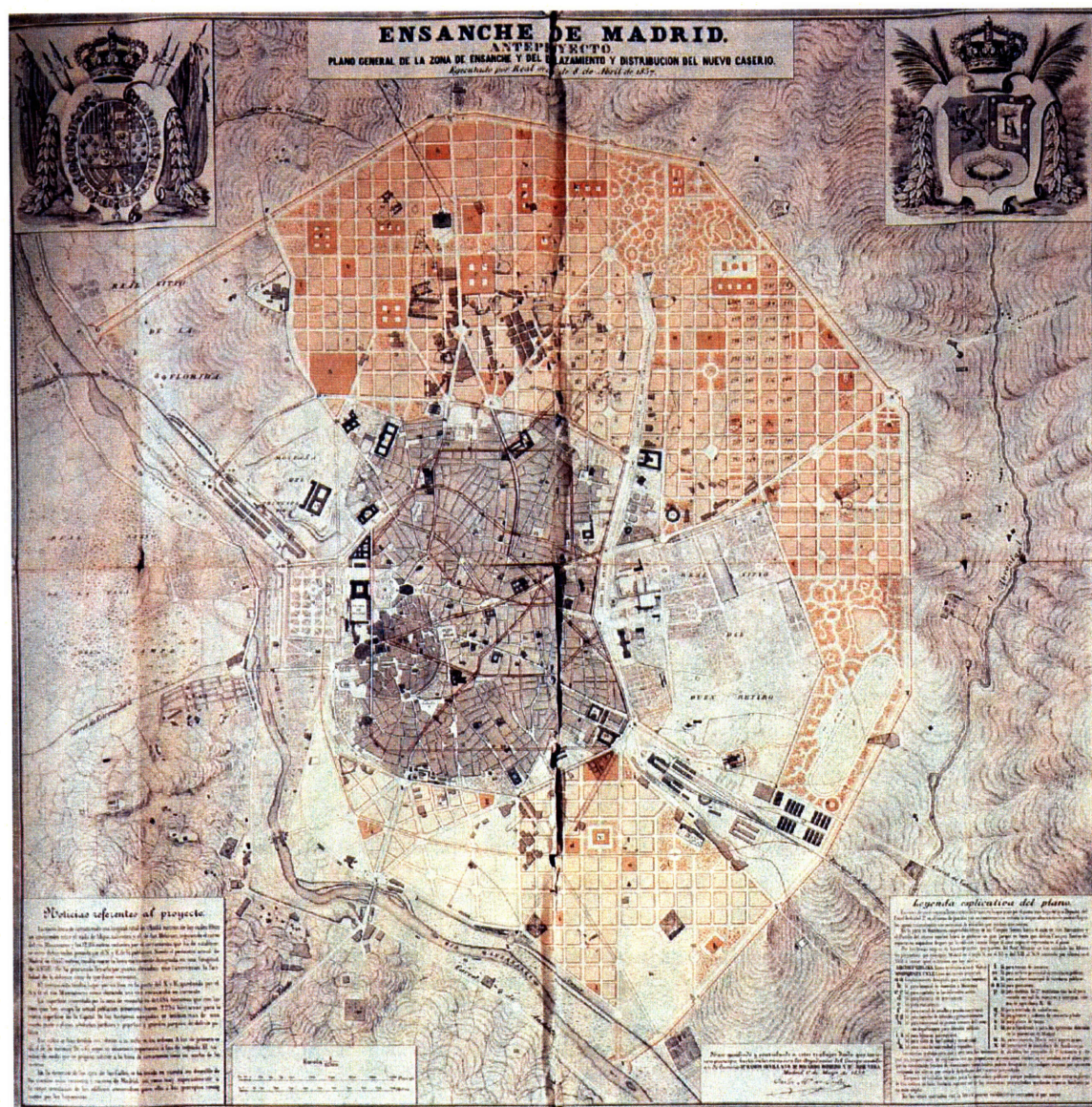


Fig. 78: Cerdá's proposal for Madrid's Extension Plan (1857).

4.2 The Eixample's variations

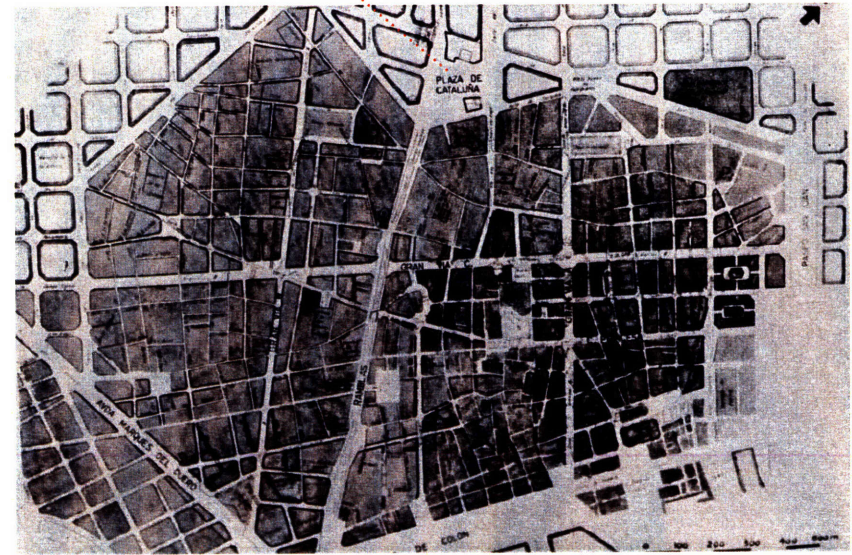
Once the project was approved in 1860, Cerdá was involved in the early stage of the Eixample. During the first five years (from 1860 to 1865), he supervised the parcel division and the technical process of preparing the land for the construction. In this stage he also reallocated a space for the "central plaza," originally assigned to the "Les Glories" plaza.⁴⁷ Initially, this plaza was located in the intersection of three 50-meter-wide connectors: Meridiana, Diagonal, and Gran Via. This new central plaza, named Plaza Catalunya, was located in the intersection between the south edge of the Eixample –also where Passeig de Gracia meets Portal del Angel– and the old city.

As the creator of the Eixample, Cerdá became responsible for the construction supervision, which meant not only to supervise and decide matters concerning demolitions, construction and sanitary licenses –among others—but also to settle the construction regulations (ordinanzas). Moreover, he had to deal with many different administrative groups that had diverse economic, administrative, and political interests, among others. Unlike Baron Haussman's task of developing the city of Paris with Napoleon as the only authority behind it, for the building development of the Eixample, several clients, land owners, real estate agents, and administrators were involved, making the decision process extremely complicated. As a result of this process, some of the original theories of Cerdá's project, including the economic report, were never applied or if so, were modified from his original plan. His vision allowed him to be strict enough to defend his ideals at the same time as he was flexible in order to adapt to diverse demands. Like Alber Serratosa says, "what motivated Cerdá was not a personal ambition, but a deep sense of responsibility."⁴⁸

Fig. 79: 1859 proposal for Plaza Catalunya



Fig. 80: Plaza Catalunya in today's location.



Figs. 81 and 82: Plaza Catalunya's location. Fig. 81 shows the first proposal submitted in the 1859 plan and figure 82 the new location and design made in 1863. Plaza Catalunya is the linking open space between the old city and the Eixample.

An example of transformation that has been mutating since its origins is the interior of the block. The ordinances for the plot building ratio have changed since its origin to the present time. These changes can be classified into four groups,⁴⁹ according to the period in which the ordinances have been modified. The first period, for example, includes Cerdá's regulations, which were followed until 1889. These regulations pursued the initial scheme of building only 50% of the block, leaving the other 50% as gardens. His project also demanded 16 meters as the maximum building height, with three upper stories besides the ground floor.

Returning to the plot building ratio as an example, Cerdá's regulations were followed until 1889, twelve years after he died. The new regulations were followed until 1932 and modified the plot building ratio from 50% to 73.6%, permitting construction in the patios and a maximum building height of 22 meters, ignoring Cerdá's original idea of the courtyard. A third period (from 1933 to 1975) only changed the building height to 24.40 meters. Finally, revisions were made in 1976, when the Metropolitan Master Plan, which is currently in use, was created. This reconsideration was the beginning of a return to Cerdá's vision, which includes reducing the Eixample's density as well as restoring the original idea of having a green city.⁵⁰

It took several decades for the Catalans to understand Cerdá and his ideals. He was once rejected by many people who stated that “along the parade of identical blocks, an enormous sadness unfolded.”⁵¹ He and his plan were depreciated and even hated. The bourgeois class could not easily support and identify with a man whose values rejected marking

distinctions between social classes. Architects in general did not know how to deal with an engineer who was attracted to “modernity” but also had a social component. Architects contemporary with Gaudí, such as Josep Puig i Cadafalch, prior to the realization that the Eixample was the perfect setting for Modernism, disagreed with Cerdá's “simple and repetitive plan.” Puig i Cadafalch, as a reaction to Cerdá and to the “irreparable wrong he did to the city,” organized and led the burning of Cerdá's writings.⁵² It is little surprise to find that when Cerdá left Barcelona, on July 22, 1875, shortly before his death, he wrote in his personal diary:

At 2.45 in the afternoon the train left for Valencia and it seemed that I was waking up out of a deep stupor. I was leaving, perhaps forever, the city of Barcelona, for which in good faith I can say I have striven to do my utmost despite [harbouring] deep inside me the conviction that it will never know how to thank me for it.⁵³

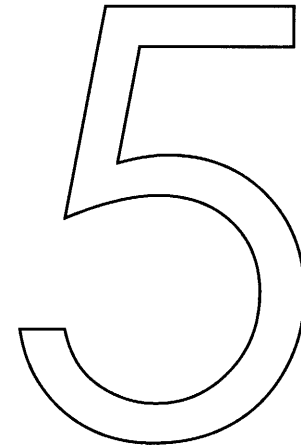
In order to digest Cerdá's plan, first of all it is important to recognize him as an engineer with a social component, which is what distinguished him from other engineers, and what gave him the amazing capacity of thinking about cities as social entities, receptive to infinitive agents. Also, we must understand that although he presented an extremely detailed plan, the bases and rationale behind it is what makes it valuable. Therefore, in order to appreciate Cerdá's plan, it needs to be studied as a whole.

To summarize, in my opinion, the most valuable aspect about Cerdá is not his devotion and dedication to the plan, not even the way he carefully studied the industrial city in order to analyze and conclude which were their necessities. The most valuable aspect about Cerdá is his incredible vision during the process of creating a treatise. **These theories led to a plan that stands out among the other nineteenth century urban design projects because it is not an individual utopian project created for an "ideal city", it is tangible. His proposal is remarkable not only for its critical reaction to conditions "on the ground" but also for the singular fact that it was, in the end, fought for and deployed.**

Valeria Alonso-Fernández

5. **THE EIXAMPLE TODAY**

In order to evaluate the Eixample today, it is important to study it as a social body that responds to everyday routines, economic, political, and cultural forces, and people and neighborhood concerns. This chapter will describe the Eixample area, emphasizing its density. In particular, it will explain the Proeixample project, as an attempt to diminish the Eixample's density by reinstating Cerdá's original density specifications. Moreover, this chapter intends to revisit some of Cerdá's plan elements, questioning their design, functionality, and intentions, by studying their evolution and the way the Eixample inhabitants live, move, and interact. Finally, it will offer a judgment of the value of Cerdá's project and the Eixample in the present day.



Valeria Alonso-Fernández

5 THE EIXAMPLE TODAY

5.1 Basic data

The Eixample today covers an area of 7.46 square kilometers, out of the approximately 100 square kilometers that make up the city of Barcelona. This area is divided into 11 neighborhoods, including some of the frequently mentioned former outskirts towns (Les Corts, Sarrilà, San Gervasi, Gracia, Horta, San Andres de Palomar, and San Martín de Provensals), the Ciutat Vella or "old city," and the Eixample.

In one of these areas, the *dreta d l'Eixample* or "right-hand side," contrary to what Cerdà speculated (at the crossing of *Consell de Cent* and *Roger de Lluria*), the bourgeois class settled. Several Modernist buildings, such as the *Pedrera*, *casa Batlló*, and *casa Amatller*, are located in this area, giving the Eixample quarter an additional significance, to be discussed later in this chapter.

	Eixample	Barcelona
Population 1996	248,777	1,508,805
Population 2004	260,237	1,578,546
area in km ²	7.46	100.95
density (people / km ²) 1996	33,348.12	14,946.06
density (people / km ²) 2004	34,884.32	15,636.91
Density Growth	5%	5%
Difference vs. average 1996	2.23x	
Difference vs. average 2004	2.23x	

Fig. 83 : compares the density between the Eixample and Barcelona, indicating not only the way both have grown but also how the Eixample is 2.23 more dense. Surprisingly, this number has not changed from 1996 to 2004, which also indicates that Barcelona has experienced a population growth.

About 15% of the total population lives in this quarter. As we can see in Figure 83, density grew from 1996 to 2004. What is even more interesting from this figure is that the Eixample is 2.23 times denser than the whole city of Barcelona, which reflects the Eixample's popularity and success due to its diversity and functionality. This diversity⁵⁴ is given not only by the mix-used buildings but also by the population, which includes different ages, nationalities, and socio economic levels,⁵⁵ among others.

The density growth has both a positive and a negative effect in the quarter; the positive side of having it grow in terms of total population is that it maintains its dynamism and it continues to be well kept. Its regrettable counterpart, discussed in the previous chapter, is that density in the Eixample has created, together with real estate interests, a damaging physical phenomenon in the way the blocks have been treated by even adding buildings in the space that was once supposed to be assigned for public, open spaces.



Fig. 84: the community and the city changed the original plan by increasing density, building in the central courtyards, and not respecting the idea of having green public spaces.

5.2 The block recuperation

After many years of reconsideration, the Eixample came to be valued not only for being the ideal scenery for Catalan Modernism, but also for its functionality and adaptation to the city's metamorphosis. As part of the idea of recovering Cerdá's original proposals, corporations supported by the City Council such as ProEixample encouraged the revitalization. Their mission focuses, among others, on the reactivation of the streets and open spaces and the recuperation of the block courtyards.⁵⁶ The idea of converting the blocks into public, green areas is a way of lowering density by regaining Cerdá's original intention.

Proeixample was created in the second half of the 1990's when the City Council decided to take action, encouraging corporations to invest in the improvement and revitalization of the block courtyards. This corporation would not only revive Cerdá's original idea of creating a green city and improving the interior life quality but also promote residential housing and the district's centrality, incorporating sustainability criteria. To regain and clear the centers of the blocks follows a complicated and slow process that cannot be detailed here. Nevertheless, in spite of these difficulties—relocating residential, parking, and storage buildings—Proeixample has recovered 40 block interiors, which represents 85,290 m² and the equivalent of eleven official soccer fields.

In order to decide which blocks to recover, Proeixample follows a strategy of analyzing two main aspects of the blocks: the first is the level of difficulty of cleaning the inner space of the block or courtyard. For this, a further examination has to be made: a description that includes the number of people that live in the block, its enclosure (if it has public access), the inner space (if it has buildings and / or activities taking place), and any underground construction. The second aspect is the block's location. As Proeixample recovers more courtyards, the areas that have not been restored become a priority. Also as part of their strategy, Proeixample intends to have nine inner block spaces cleared and opened to the public before 2010. This will provide inhabitants of the neighborhood with a green space approximately every 300 meters.

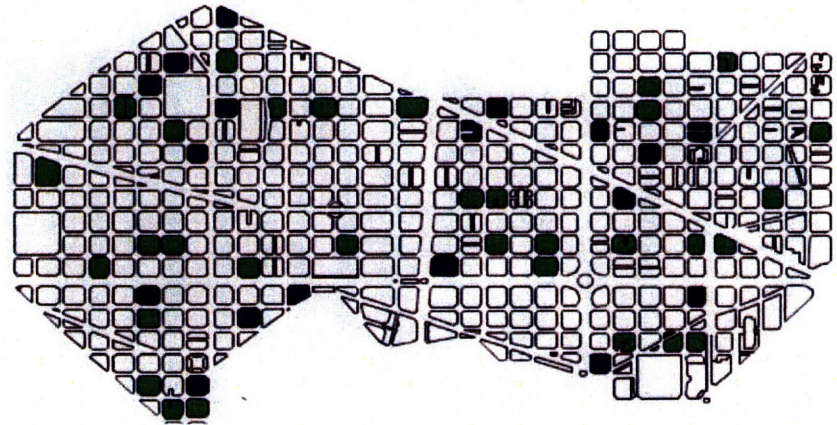


Fig. 85 shows in green the blocks that Proeixample has already cleared and in blue the ones that are in process.



Fig. 86: Cesar Martinell's block recuperation.



Fig. 87 : Passatge de la Concepción, perpendicular to Passeig de Gracia, between Roselló and Provença.

5.3 Three of today's Eixample's debatable elements

Although the Eixample has been through a re-evaluation process, some of its most important elements are still debatable. This study will do a subjective analysis of three debatable physical aspects: the passatges or residential alleys, the functionality of the chamfered corners, and Plaza Catalunya's design and use.

A negative opinion about Cerdá's plan has been expressed by people who consider that the implementation the plan in such topography created an irregularity in zoning. As a result, some open, narrow spaces between buildings were transformed into passatges or internal pedestrian roads. This is considered a failure because it is said to be the result of an inadequately considered plan. There are forty-five of these passatges (alleys or internal roads) in the Eixample, thirteen of which cannot be touched because they have been classified as private property.⁵⁷ In my opinion, these significant modifications are an example of a positive transformation, which improves the urban quality of the city, providing a different well-designed space –sometimes residential and sometimes commercial– that connects the city in a special way. The urban nature of these passatges is not only an evidence of the evolution of the plan but also a symbol in the city.

Another controversial symbol, which distinguishes the plan from the others is the chamfered corner. When we think of the Cerdá's Eixample, the image we probably have is of a plan created by a grid formed by identical blocks. The "block" together with its chamfered corner and courtyard has become a symbol. But, is this symbol functional? Besides Passeig de Gracia, almost all the sidewalks in the Eixample follow the 45-degree-cut gesture. These different treatments create different pedestrian situations. Crossing a street from a typical chamfered block is not complicated, but requires walking for a longer distance. Similarly but worse, crossing the Diagonal Avenue from Passeig de Gracia to the Gracia neighborhood, for example, results in an extremely complicated task. When I asked Joaquim Sabaté about his opinion on this matter, he answered that even taking into account the negative aspects of the chamfered corners, they provide an advantage by generating openings, perspectives, and rhythms, not only for drivers but also for pedestrians.⁵⁸



Fig. 88

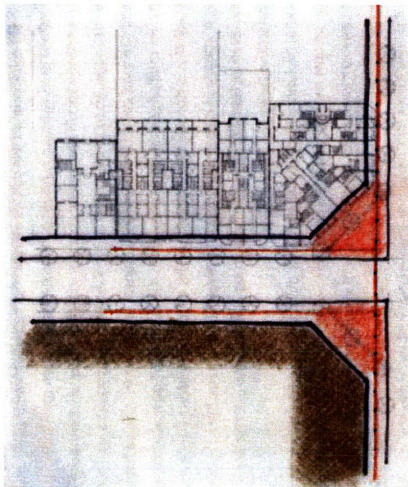


Fig. 89 shows how the ninety degree sidewalks, together with the chamfered corner blocks, create a special opening in the corners.

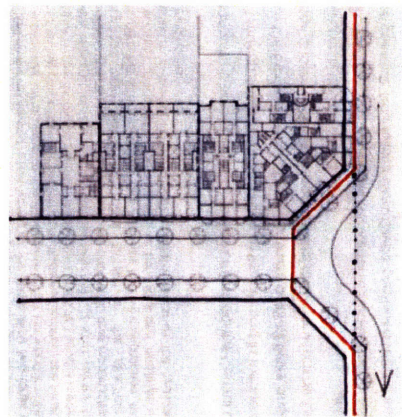


Fig. 90.
Figs. 88 and 90 explain the pedestrian route created by the chamfered corner followed by a chamfered sidewalk.

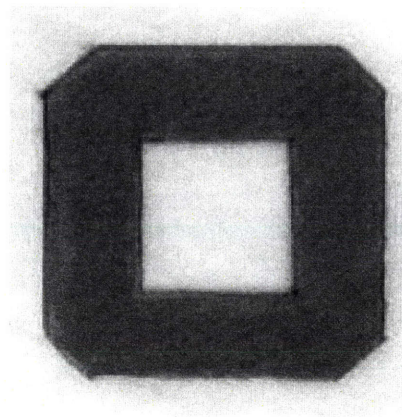


Fig. 91: The block's shape, with its measurements, chamfered cut corners, and courtyard, has become a symbol.



Figs. 92 and 93: Plaza Catalunya, an isolated, empty urban space that links the vivid neighborhood of the Eixample with the also vivid "Barrio Gótico" or old city.

The third element we will analyze is Plaza Catalunya. Oriol Bohigas in his article "Puig I Cadafalch against Idelfonso Cerda"⁵⁹ criticizes the naivety of Cerda's rectangular trace and the poor design for Plaza Catalunya. In my opinion, if we described Plaza Catalunya with its tall fountains and trees to anyone who has not been in Barcelona, they would think this is a heavily visited plaza. Furthermore, with its strategic position in the city and its supposed linking role between the old city and the Eixample, it is interesting and simultaneously puzzling to find out that the streets surrounding Plaza Catalunya are full of people, yet the plaza itself is almost empty, with almost nobody even crossing it. The reason behind this phenomenon is the design of the plaza itself: its green spaces, shape, size, and, above all, proportions. Due to its poor design, hardly any public activities take place there; the only uses we can identify are the supposed function of the plaza as a connecting open space (through which people in fact hardly pass and never linger) and the locating of a parking garage, subway and railway station underneath it. Plaza Catalunya, with a strategic position that links the old city with the Eixample has, as described before, poor characteristics. Assuming that the reason behind this lack of urban quality is that the plaza was not originally meant to be the way it is today (see images 93 and 94), the plaza must be seen as an opportunity for future design.

5.4 The value of the Eixample

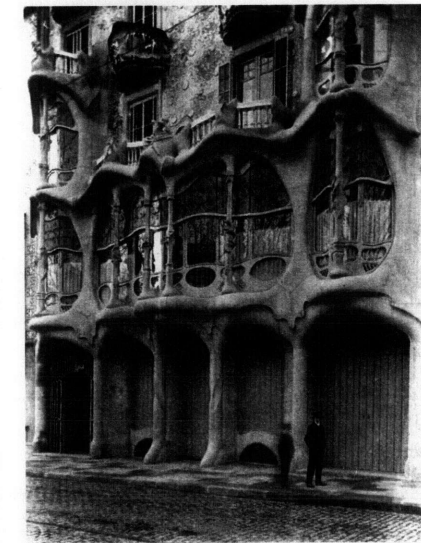
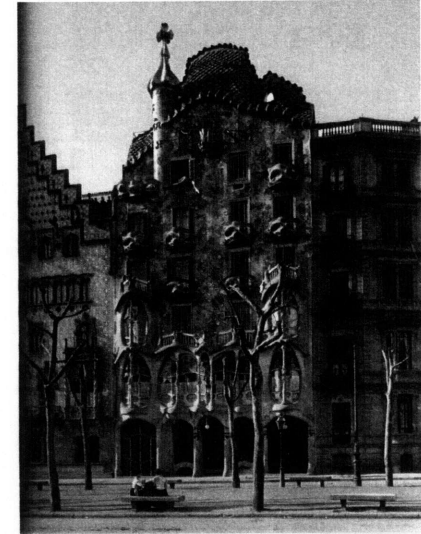
Bohigas also disapproves the block dimensions of the Eixample. He supports Puig i Cadafalch's⁶⁰ old arguments that criticized the idea of having internal patios and unified facades with no hierarchy. To the contrary, this thesis argues that the rigidity and equality of the grid gives structure and allows the plan to evolve.

A significant number of art nouveau houses are located here, standing out but simultaneously adapting in the context. The structure and "rigidity" was ideal for the modern buildings, full of aesthetic intentions. The fabric continuity, for example, is one of the reasons why the Eixample allowed alterations without losing its initial rationale. This rationale has become, in a way, a tradition, and by having it to update, has, in a way, created an urban consciousness.

Considering that Cerdá's plan has been successful in part because of his meticulous studies, is it necessary to study the people and the site's conditions for such a long period in order to develop a coherent and enduring plan? These questions have no easy answers and certainly do not lead directly to a conclusion but we can infer that the Eixample is definitely the result of a theory that could not have been developed without previous studies and the real understanding of the emerging industrial society.

The next step is to speculate about what is that makes the Eixample still function today. One of the main elements of the present day city of Barcelona which not only gives structure but also makes the user comprehend and find its bearings in the city is Passeig de Gracia. Once considered the main street of the Eixample development, it has become much more than just a linking, revitalizing axis. It is an axis that together with La Gran Via street follows the roman trace and recreates the "new *cardus* and *decumanus*." With clear starting (Plaza Catalunya) and ending (Diagonal Avenue) points, Passeig de Gracia, with its delicate design, has turned into one of the most vivid streets in the city.

Contrary to Cerdá's original intention, and from the Eixample's construction, Passeig de Gracia was considered a stylish boulevard to live in, reason enough for the Catalans bourgeois to develop their houses in this boulevard. Also as a response to the way that this boulevard has been treated, it has become, after Portal del Angel, the second most expensive retail street in Barcelona, competing with the most expensive establishments in the "City" of London. Although this differs with Cerdá's original intention of creating a non-hierarchical plan, the suc-



Figs. 94 and 95: Gaudi's Casa Batlló in Passeig de Gracia.



cess of Passeig de Gracia is unquestionable; it has positively transformed through time as it exerts its functionality "urban" roles. It is another clear example of how the rationality of the grid is not only maintained through time but also provides structure even if some of the elements of the grid have changed in a way that was not planned, adding value to the Eixample and to the city.

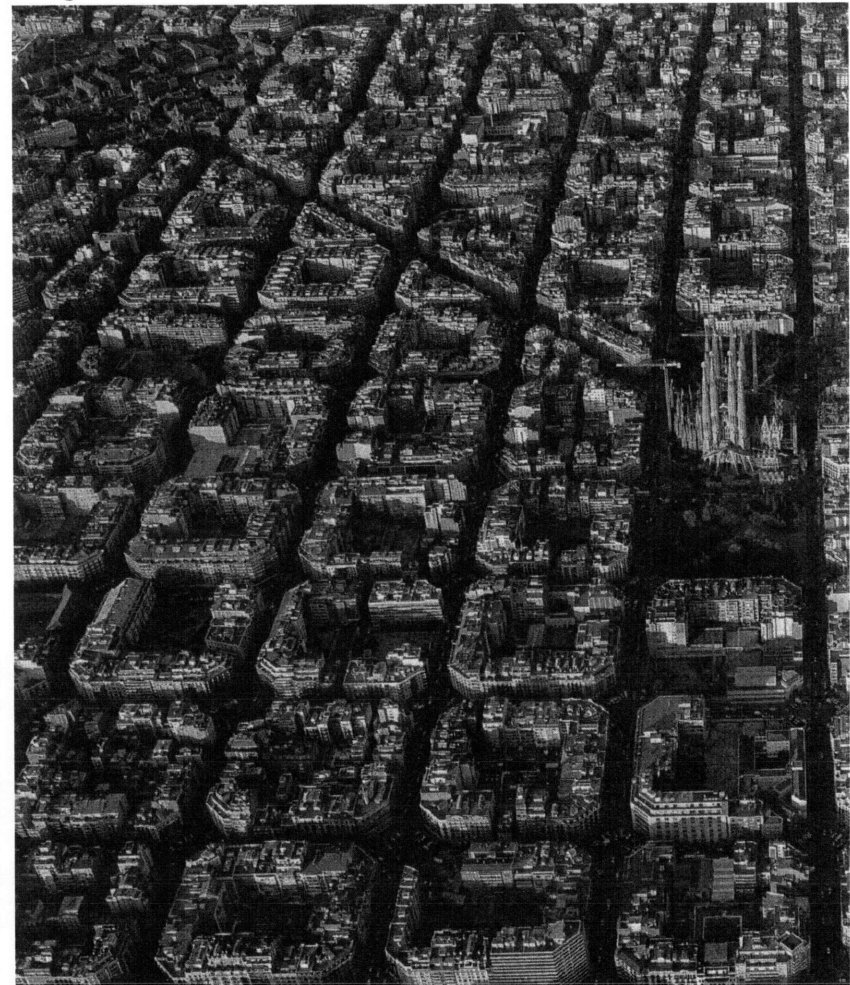
What is then, what makes Cerdá's plan remarkable? This question certainly does not have a direct answer. Yet, in order to respond, we first need to define urban design as a discipline formed by two main components: the artistic creation of designing and the act of dissecting the society's needs in order to create a program and a set of policies in order to satisfy them. These two components, which are supposed to be inseparably linked, are considered by some to suffer a rupture in today's digital era. "The fracture has many causes –historical, professional, ideological, academic, egocentric, as well as misplaced idealism." Some contemporary architects and planners, like Henco Bekkerink, conscious of this fracture, believe:

Society is continually changing, but the duration of squares and buildings operates in a much longer time cycle. The memories they evoke have an equally intractable constancy. That significance has become embodied in stone and is kept alive, in spite of the changes in society itself. The function of the past resulted in form, which acquired significance. The significance now associated with the form has become the function for society. If as a result of the mechanism of tradition these significances continue to play a role in the collective consciousness of society (which they do by their very definition), then an understanding of them is requisite for the discipline of urban planning. This is equally true for the design of the new public spaces, for example intermediary public spaces connecting large infrastructures to urban networks.⁶³

Figs. 96 and 97 show the exquisite design and liveliness of Passeig de Gracia.

The city of Barcelona, like any living city, is the result of interacting forces that are constantly impinging on it. This is what actually distinguishes a real city from "artificial cities" such as theme parks. **Cities cannot be considered as finished compositions; they undergo continuous alterations. Therefore, a well designed plan not only permits modifications, but adapts to them, without losing its rationale.**

Considering the themes of change and consistency, we come to recognize Cerdás major achievements. Cerdá, being responsive to the city's necessities, was able to design a functional city that incorporated social values. He created a plan that could take its own course affording alterations and new juxtapositions without losing its essence. His plan is remarkable not only for being one of the pioneer modern plans, but also for its continuing vitality.



Figs. 98 and 99 show the vitality and structure of the city of Barcelona.

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APENDIX



Fig. 100: The Eixample in a 1-10,000 scale. (scale in meters)



Fig. 101: The Eixample 1-1,000

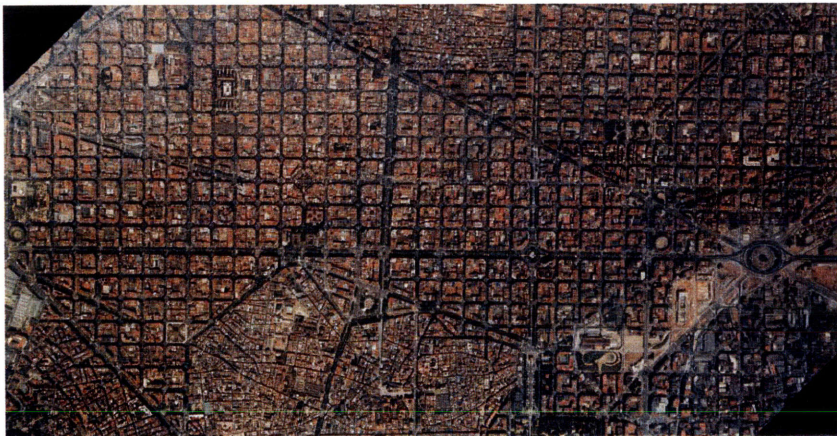


Fig. 102: The Eixample 1-5,000



Fig. 103: Venice in a 1-5,000 scale.

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NOTES

Title

- 1 From a conversation with Joaquim Sabaté at the UPC on January 14, 2008.
- 2 Fabián Estapé, *Viday Obra de Idelfonso Cerdá* (Barcelona: Península, 2001), 13.
- 3 Generalitat de Catalunya, *Cerda: Urbs i Territori* (Madrid: Electa, 1996), 19.

Chapter 1: Cerdá's first impression of a city: Barcelona in 1831

- 4 We can assume Cerdá arrived in a carriage because of the fact that the first Spanish railway system did not open until 1848, with the Barcelona-Mataró line.
- 5 Even today, the Roman center (plaza Sant Jaume) has a political, civic, and cultural use.
- 6 F. Braudel, *El Mediterraneo y el mundo mediterraneo en la época de Felipe II* (México: FCE, 1976), 2nd vol.
- 7 Gary Wray Mc Donough, *Good Families of Barcelona: A Social History of Power in the Industrial Era* (Princeton: Princeton University Press, 1986), 262.
- 8 Robert Hughes, *Barcelona* (New York: Alfred A. Knopf, 1992), 190.
- 9 Joan Busquets, *Barcelona, The Urban Evolution of a Compact City* (Rovereto: Litografia Stella, 2005), 117.
- 10 Luis Calvet, "Barcelona: The Transition of the Urban Form" (MArch thesis, MIT, 1979), 9.
- 11 Steve Johnson, *The Ghost Map* (NY: Penguin Group, 2006)
- 12 London was such a dense city that when cholera attacked it, people believed it was caused by the insufficiency and quality of the air they were inhaling –a result of large amounts of garbage and human waste thrown into cesspools. Waterborne disease was transferred from one neighborhood to another because people shared the same pump and, therefore, the same water conditions.
- 13 Patrick Suskind, *Perfume: the Story of a Murderer* (NY: Knopf Publishing Group, 2001)

Chapter 2: Cerdá's Studies

- 14 Although he did some studies of mathematics and architecture in Barcelona at the Escuela Junta de Comercio, he did not receive the degree for either. Nevertheless, we can infer that these studies helped him with his application to the Escuela de Caminos, Canales y Puertos.
- 15 Cerdá's family did not support Cerdá's idea of studying in Madrid.
- 16 Generalitat de Catalunya, *Cerda: Urbs i Territori* (Madrid: Electa, 1996), 146.
- 17 In the year of 1850 Cerda was elected a member of Parliament for the Second District of Barcelona. He became a member of three important institutions: the Madrid Parliament (1851-1852), the Barcelona City Council (1854-56 and 1863-66), and the Provincial Council, where he became its interim President (1873-74).
- 18 Christian Hermansen, *Idelfonso Cerdá and Modernity in Tracing Modernity: Manifestations of the Mod-*

ern Architecture and the City (New York: Routledge, 2004), 220.

19 Ibid, 228.

20 Eric Hobsbawm, *The Age of Revolution* (London: Abacus, 2007), part 1.

21 Etienne Cabet, *History and Constitution of the Icarian Community* (NY: AMS Press, 1975)

22 Ibid, 247.

23 Robert Hughes, *Barcelona* (New York: Alfred A. Knopf, 1992), 279.

24 Etienne Cabet, *History and Constitution of the Icarian Community* (NY: AMS Press, 1975), 224.

25 Mathew Stewart, *Monturiol's Dream* (NY: Pantheon, 2003), 44.

26 S.T.- Barcelona, "Barcelona rememora la caída de sus murallas" *El Pais*, <http://www.elpais.com/global/>

27 Robert Hughes, *Barcelona* (New York: Alfred A. Knopf, 1992), 19.

28 Description found in the plan signed on 1838 by Francesco Huarte Jauregui. This plan can be found at the Biblioteca de la Prefectura de Ingenieros, by its call number: 101-I.

29 In his diary, Cerdá mentions the difficulties he confronted when the data were not gathered by him, due to the different objectives with which they were gathered.

30 All these statistics and figures were part of his "Teoría de la construcción de las ciudades aplicada al proyecto de reforma y ensanche de Barcelona:" Ministerio para las Administraciones Publicas, Ajuntament de Barcelona, *Cerda: Madrid y Barcelona* (Barcelona: Closas-Orcoyen, S.L, 1991)

31 Joan Busquets, *Barcelona, The Urban Evolution of a Compact City* (Rovereto: Italy, 2006), 128.

32 Generalitat de Catalunya, *Cerda: Urbs i Territori* (Madrid: Electa, 1996), 37.

33 Ministerio para las Administraciones Publicas, Ajuntament de Barcelona, *Cerda: Madrid y Barcelona* (Barcelona: Closas-Orcoyen, S.L, 1991), 107.

34 Ibid.

Chapter 3: The Eixample project

35 Allan B. Jacobs, *Great Streets* (MIT Press, 1995).

36 Miquel Corominas i Ayala, *Los orígenes del Ensanche de Barcelona: Suelo, técnica e iniciativa* (Barcelona: UPC, 2002), 71.

37 Ibid, 75.

38 Ruperto Lacosta, *Paralelo entre el proyecto de ensanche de Barcelona de D. Antonio Rovira y Trias*. Ministerio para las Administraciones Publicas, Ajuntament de Barcelona. *Cerda: Madrid y Barcelona* (Barcelona: Closas-Orcoyen,S.L, 1991), 22.

Chapter 4: Idelfonso Cerdá's Plan

39 Ministerio para las Administraciones Publicas, Ajuntament de Barcelona, *Cerda: Madrid y Barcelona* (Barcelona: Closas-Orcoyen, S.L, 1991), 112.

40 As mentioned in the previous chapter, Passeig de Gracia's original width was not modified. Today, its width is the widest of the Eixample –60 meters or 200 ft—remaining as an important linking and revitalizing axis.

- 41** Ministerio para las Administraciones Publicas, Ajuntament de Barcelona, Cerda: Madrid y Barcelona (Barcelona: Closas-Orcoyen, S.L, 1991), 261.
- 42** Generalitat de Catalunya, Cerda: Urbs i Territori (Madrid: Electa, 1996), 70.
- 43** Miguel Corrominas Ayala, in his book Los Origenes del Ensanche de Barcelona. Suelo, técnica e iniciativa, which bibliography is used in this thesis, portrays a detailed study of the Eixample block, its origin and how it has evolved over time (including the purchase and sale process).
- 44** Generalitat de Catalunya, Cerda: Urbs i Territori (Madrid: Electa, 1996), 88.
- 45** Ibid, 84.
- 46** Ibid, 287.
- 47** <http://www.proeixample.com> (accessed April 24, 2008)
- 48** Generalitat de Catalunya, Cerda: Urbs i Territori (Madrid: Electa, 1996), 47.
- 49** Ajuntament de Barcelona, Area d'Urbanisme, Estudi de L'Eixample (Bcn: Grup 3, S.A, 1983)
- 50** <http://www.proeixample.com> (accessed April 24, 2008)
- 51** Carlos Soldevilla, Gracias y desgracias de Barcelona. Ministerio para las Administraciones Publicas, Ajuntament de Barcelona, Cerda: Madrid y Barcelona (Barcelona: Spain, 1992), 22.
- 52** From a conversation with Joan Busquets at the GSD on April 14, 2008.
- 53** Quote taken from Cerdá's diary (Idelfonso Cerdá, Diario, 1875). Generalitat de Catalunya, Cerda: Urbs i Territori (Madrid: Electa, 1996), 185.

Chapter 5: The Eixample Today

- 54** One of the largest gay communities is located in the Eixample. In order to see where this area is located go to: <http://wikimapia.org/#lat=41.3851807&lon=2.1647787&z=15&l=3&m=a&v=2> (accessed on May 6, 2008).
- 55** Depending on the area, the Eixample can be both one of the most expensive places to live in, or an affordable area for students and young people.
- 56** In 2004, the City Council of Barcelona created the Barcelona de Infraestructuras Municipales S.A (BIM-SA) partnership, which grouped all the companies that invested in the project. In order to see who belongs this group go to : www.proeixample.com (accessed on April, 2008)
- 57** Lluís Pellicer, "La herencia indeseada de Cerda" El Pais, <http://www.elpais.com/global>
- 58** From a conversation with Joaquim Sabaté at the UPC on January 14, 2008.
- 59** Oriol Bohigas, "Puig I Cadafalch against Idelfonso Cerda" El Pais, <http://www.elpais.com/global/>
- 60** Josep Puig I Cadafalch arguments against Cerda's plan can be found in three articles he published in La Veu de Catalunya in 1900 and 1901.
- 61** Lluís Pellicer, Los locales de Barcelona son más caros que los de la City de Londres, El Pais, <http://www.elpais.com/global/>
- 62** Alexander R. Cuthbert, Urban design: requiem for an era –review and critique of the last 50 years (Sydney: Palgrave Macmillan Ltd, 2007), 177.
- 63** Henco Bekkerink, Cities in Transition (Rotterdam: 010 Publishers, 1996), 430.

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Valeria Alonso (b. 1977) was born and raised in Mexico City. From 1997 to 2002 she completed her bachelors of architecture in Mexico City's *Universidad Iberoamericana* and studied abroad in Barcelona at the *Universidad Politecnica de Catalunya* (UPC). Her B.A. thesis "Psychiatric Hospital with Art Workshops" explored a large-scale project located in Valle de Bravo, Mexico. In 2003, Valeria went back to Barcelona to complete a Masters in Art, Architecture and Ephemeral Space at the UPC. Her thesis "Art Therapy Unit," expanded on the original idea of her B.A. thesis –treatment through the "artistic space," where she continued to design the "healing realm" by exploring different possible scales. After working for two years in Mexico City-based architecture design studios, Valeria enrolled at the Massachusetts Institute of Technology in a Master's Degree of Science in Architecture Studies. While at MIT, Valeria was partially supported by a scholarship from the *Fondo Nacional para la Cultura y las Artes* (FONCA).