THE TOWER

A STUDY IN CHANGE OF MEANING

by Gail Fenske
Bachelor of Architecture
Arizona State University, 1977

Submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Architecture Studies

at the
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
February 1982

The Author hereby grants to M.I.T. the permission
to reproduce and distribute publically copies of
this thesis document in whole or in part.

Signature of Author:__

ᴅᴇᴘᴀʀᴛᴍᴇɴᴛ ᴏ𝚏 ᴀʀᴄʜɪᴛᴇᴄᴛᴜʀᴇ
July 1, 1981

Certified by:_|

Stanford Anderson
Professor of Architecture
Thesis Supervisor

Accepted by:

Julian Beinart, Chairman
Departmental Committee
for Graduate Students

i

To Stanford Anderson,
an enduring inspiration;
and also to my best friend, Don.

iv

CONTENTS

ABSTRACT

THE TOWER: A STUDY IN CHANGE OF MEANING

Submitted to the Department of Architecture on July 6,
1981, in partial fulfillment of the requirements for
the degree of Master of Science in Architecture Studies.

ABSTRACT

The historical transformation of the meaning of the
tower is studied in this thesis through a series of
descriptive essays that as a whole, reflect, reinforce
one another, and in so doing reveal common or related
characteristics to tower building across time.

Each essay represents a contextual framework; the
meaning of the tower, suspended in the framework, is
revealed through the characteristics of appearance,
function, and purpose, their interrelationship, and
their relationship with the given set of historical
and environmental conditions. When a tower acquires a
powerful context-independent meaning it has achieved
the status of a myth or an idealized image.

The analysis of the essays isolates themes, or continu-
ities of the characteristics of meaning across historical
and environmental frameworks, and defines them with
examples and comparisons from the essays.

When the skyscraper is evaluated with reference to
the themes, its meaning in relationship to towers of
the past and to the framework of the present day is
elucidated.

Thesis Supervisor: Stanford Anderson
Title: Professor of Architecture

I wish to build a building twice
as high as the Eiffel Tower, placed
in the middle of the heartland of
America, as our new Capitol.

Philip Johnson

"25 Cultural Wishes
for the New Year"
New York Times
December 28, 1980

2
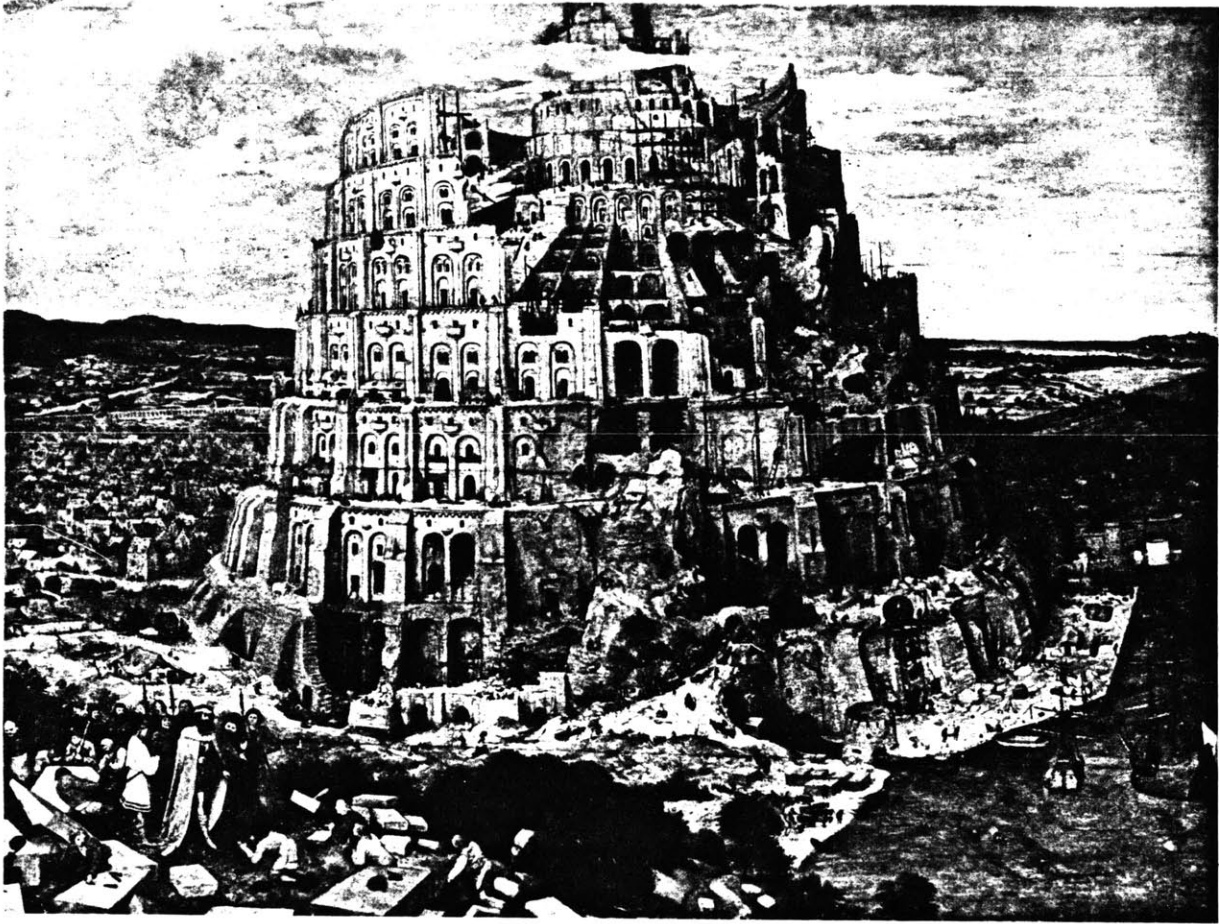
INTRODUCTION

It is not hard to realize that we perceive the con-
temporary skyscraper very differently from towers of
the past. But it is much more difficult to understand
why. The intent of this study is to show how the
meaning of the tower has changed, from the earliest
towers constructed to the skyscraper of the present day.
Prior to the initiation of an investigation on the
nature of the tower and its historical transformations,
the scope of the pursuit should be delimited by defini-
tion of the phenomenon examined. Gwilt's Encyclopedia
of Architecture of 1851 provides a pre-skyscraper
definition of tower:

> A lofty building of several
> stories, round or polygonal. [1]

Sturgis' Dictionary of Architecture and Building of 1902
offers a post-skyscraper definition

> A structure, of any form in plan, which is
> high in proportion to its lateral dimensions;
> or which is an isolated building with vertical
> sides and simple character, even if not high
> in proporation or a part of a structure
> higher than the rest, but always having
> vertical sides for a part of its separate
> and detached altitude; or, in buildings
> erected for defence, a projecting part, nearly
> equivalent to a bastion, often, but not always,
> higher than the curtain.... Also, in fact
> though not in name, the high many-storied office
> buildings or skyscrapers of the United States,
> when assuming the form of a shaft of uniform
> width and depth, high in proportion to horizontal
> dimensions, and rising above surrounding structures. [2]

1. Pieter Bruegel,
   "The Tower of
   Babel"

3

The most obvious source is Webster:

> 1. a building or structure designed primarily
> for elevation that is higher than its diameter
> and high relative to its surroundings, that
> may stand apart (as a round tower, campanile,
> or pagoda), be attached (as a church belfry)
> to a larger structure, or project above or
> out from a wall, and that may be of skeleton
> framework (as an observation or transmission
> tower); 2. a structure or mass in the form
> of or resembling a tower... [3]

Sturgis considers the skyscraper a tower, even though
it is not called one, but Webster assumes that the sky-
scraper is not a tower, only a structure that happens
to look like one. Such confusion over the definition
of the tower implies that it is not understood fully
why the skyscraper is perhaps not truly a tower, nor why
it has assumed such a dramatically modified role in the
twentieth century cityscape. To understand why a trans-
formation has occurred in the way we perceive the tower,
one must understand how the meaning of the tower has
changed, not only currently, but since the time the
earliest tower was constructed. Examination of the
meaning of a tower to a particular place and time, or
context, can be initiated by knowing what it looked like:
whether it was tall, what shape it was, whether it appeared
to be open or closed, how it was constructed, whether it
was attached or unattached to a larger structure, what
its internal structure and system of vertical circulation
was, and what was the nature of its stylistic detail. We
also must know something about its function, its utili-
tarian value, or day-to-day use: whether it was used as
a watchtower, for fortification, as a bell tower, or a
lighthouse, a place for working or living, or whether
it had any function at all. More importantly we must
understand its purpose: why was it actually built?

4

Perhaps to scale the heavens, or to view the earth, to compete, to legitimize authority, as a civic landmark, or for purely practical reasons. An investigation such as this one provides us with a detailed description of the tower, certainly an extension of the dictionary definition, but does not provide us with a complete understanding of the meaning of the tower to a given place or time. Meaning can only be truly understood as part of a larger contextual framework, historical and environmental, a framework with which continual inter-raction occurs, where an ascribed meaning is reinforced, shaped and gradually modified. Specific purposes for building, utilitarian demands, or aesthetic considera-tions, have at times remained continuous across parti-cular contextual frameworks, have disappeared as frame-works have transformed, have recurred in later frameworks, or have been initiated as part of a new framework. As individual aspects of meaning they are continually shifting, meaning is continually transformed. In retro-spect they appear as themes and through their comparative nature provide an insight into transformations of both meaning and context. The following essays represent a series of studies of context and meaning of specific towers at a static location and time. The analysis isolates themes that have appeared across particular contextual frameworks and examines their internal trans-formations. It is believed that such an investigation will provide new insight into the towers and frameworks under consideration, including towers in the framework of the present. Overall, the question that demands an answer is: how has the meaning of the tower changed, and what implications, if any, does this have for the twentieth century skyscraper?

5

TURRIS BABEL
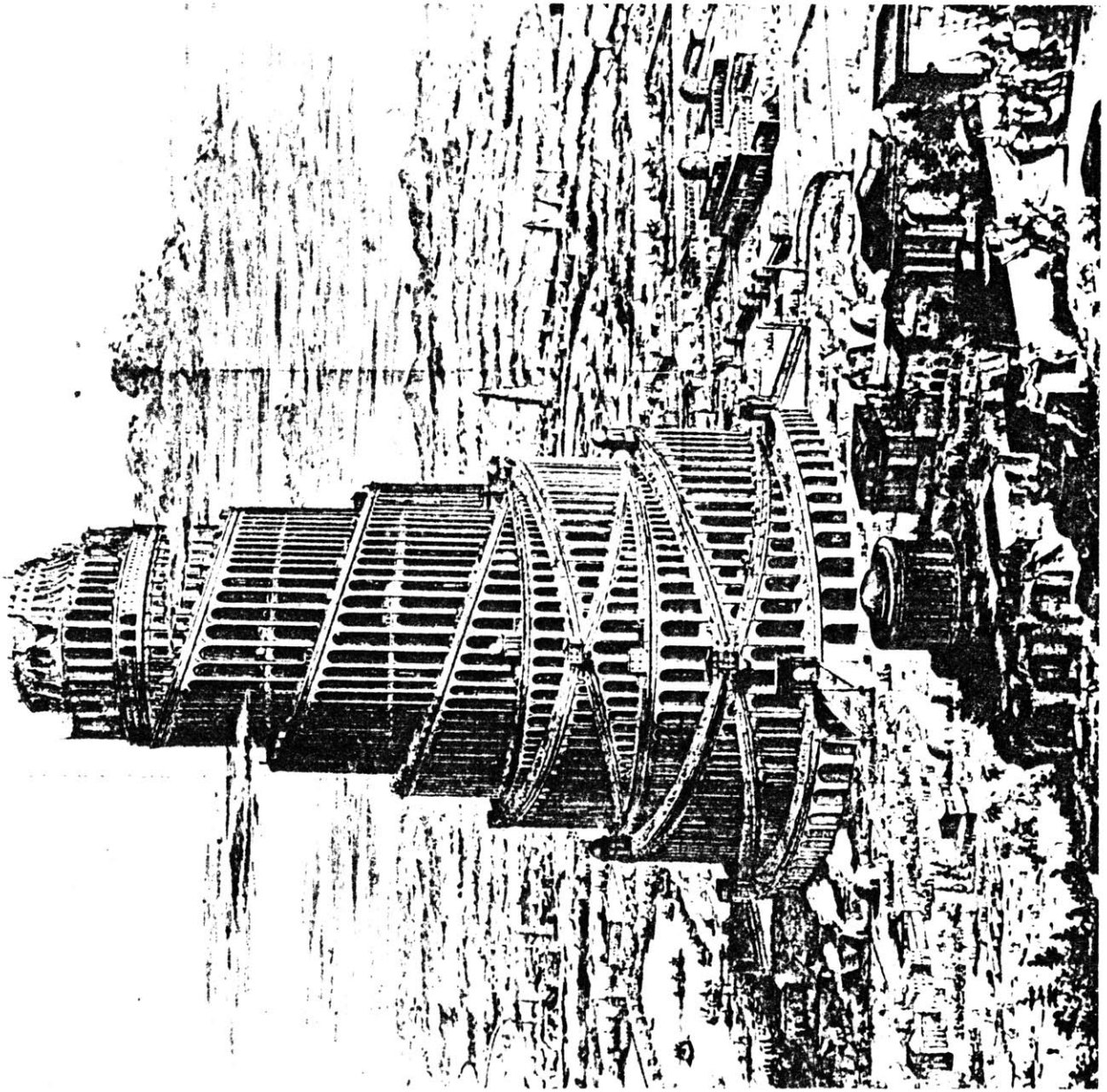
BABEL

And they said one to another, Go to, let us make
brick, and burn them thoroughly. And they had brick
for stone, and slime had they for mortar. And they
said, Go to, let us build us a city and a tower,
whose top may reach unto heaven; and let us make us
a name, lest we be scattered abroad upon the face
of the whole earth.

Genesis 11: 3-4

Early nomadic peoples were facilitated in their labors
by favorable conditions of climate and soil and settle-
ment was generated in propitious geographical regions
such as the alluvion of the Nile, the fertile lands of
the Tigris or those of the rivers of China. Rural
villages, as a result of intensified anxiety and
aggression, soon transformed into burgeoning walled
urban communities. Hammurabi laid the foundations of
Babylonian power nineteen centuries before Christ, when
the legendary eighty-two articles of his code were
dictated to him by the sun-god Shamash. He emphasized
the King of Gods, Marduk, as demonstrated in the
construction of the Marduk temple Ensanglia and the
terraced tower Etemenanki. Etemenanki, later rebuilt
in about 625 B.C. under Nebuchadnezzar, who succeeded
in making the second Babylon even greater than the
first, was to become known as the Tower of Babel.

2. Athanasius Kircher,
the Tower of Babel

According to Nebuchadnezzar, "the lord Marduk com-
manded me concerning Etemenanki, the stated tower of
Babylon, which before my time had become dilapidated

7

and ruinous, that I should make its foundations secure

in the bosom of the nether world, and make its summit
like the heavens." [1] As a result of this Tower,
Babylon in the Old Testament account disproportion-
ately dwarfed all other cities in pride.

Reconstructions of the walled city of Babylon show it
bordered by the Euphrates and two large canals.
Located near the Hanging Gardens, the Tower was
approached through the Ishtar gate, one of the eight
broad gates dedicated to the guardian divinities,
along a paved lion-flanked processional way. The
ziggurat form, upon which the Tower was based was
often more wide than high, more a hill than a tower.
But Nebuchadnezzar's structure, though retaining the
steps, made them wide and steep while greatly increas-
ing the dimensions of each tiered level: from the 109-
foot-high base of the Tower rose a 59-foot-high
second terrace, surmounted by four terraces, each
approximately 20 feet high, and topped by a 48-foot
temple that created the highest step, accessible only
to priests. The ancient traveler Herodotus of Halicar-
nassus described the approximately 300-foot high tower
in an account of his journey to Babylon in about 460 B.C.:

> ... a solid tower was constructed, one stadium in
> length and one stadium width. Upon this tower
> stood another... All eight towers can be climbed
> by means of a spiral staircase which runs round
> the outside. About half way up there are seats
> where those who make the ascent can sit and rest.
> In the topmost tower there is a great temple, and
> in the temple is a great bed richly appointed, and
> beside it a golden table. No idol stands there.
> No one spends the night there save a woman of that
> country, designated by the god himself, so I was
> told by the Chaldeans, who are the priests of that
> divinity. [2]
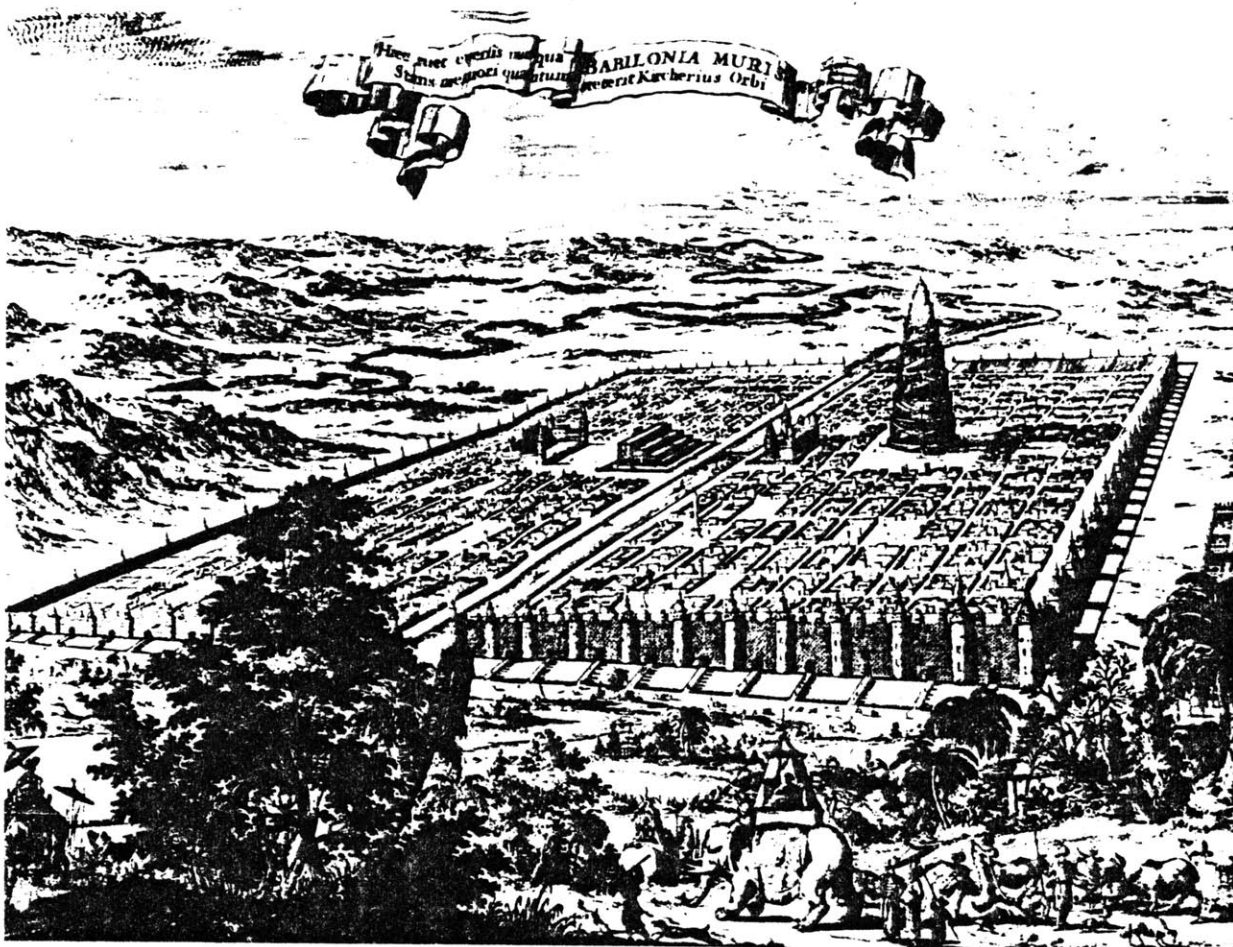
3. Athanasius Kircher,
   the city of Babylon

Without actually breaking tradition, the first great
tower had grown out of a previously terraced ziggurat
structure. The Babylonians did not see the earth as
a ball or disk, but as a pyramid of seven terraces,
in acknowledgement of the seven "planets" (five
planets were known at this time, in addition to the
sun and the moon), with the dome of three heavens
above and the ocean flowing around. In this image
Babylon, actually Bāb-ilānī, or gate of the gods,
was situated on the uppermost terrace. The stepped
pyramid dominated the city of Babylon as a replica of
the Babylonian conception of the world. Etemenanki
appropriately stood for "House of the Foundation of
Heaven and Earth."

9

The ziggurat structure was considered by the Babylon-
ians to be a link between heaven and earth, the cosmic
mountain made from primeval chaos and symbolizing the
original unity of earth and heaven. By ascending the
seven stages or the seven planetary spheres, the
priests attained the summit of the Universe. But
according to Mircea Eliade, this symbolism of climbing
and of stairs actually belongs to the archaic content
of the human psyche and is not a "historical" creation,
not an innovation dating from a certain historical
moment. The act of climbing or ascending symbolized
the way towards an absolute reality, representing the
end of the profane human condition, embodying associ-
ations of sanctification, death, or deliverance. The
stair performed the function of the bridge or ladder
between heaven and earth as seen in a dream by Jacob:
"And behold! The angels of God were ascending and
descending on it." [3]

The Biblical story of the Tower of Babel appears
repeatedly in medieval and Renaissance literature and
art where it is treated as a historical incident with
strong moralistic overtones. Of particular interest
is the devotion to it by Athanasius Kircher, the most
prominent of latter-day Christian Hermetists, whose
fundamental Christian beliefs were based on an astro-
logically ordered cosmology. The most famous Jesuit
of the seventeenth century and a man of vast and
heterogeneous learning, he was devoted to providing
a scientific underpinning to the crumbling structure
of Hermatism: with him the Hermetic tradition of the
Renaissance effectively ended. Part mystic and part
scientist, he ventured into mystical architecture

10   with Arca Noe, published in 1675 and its complement
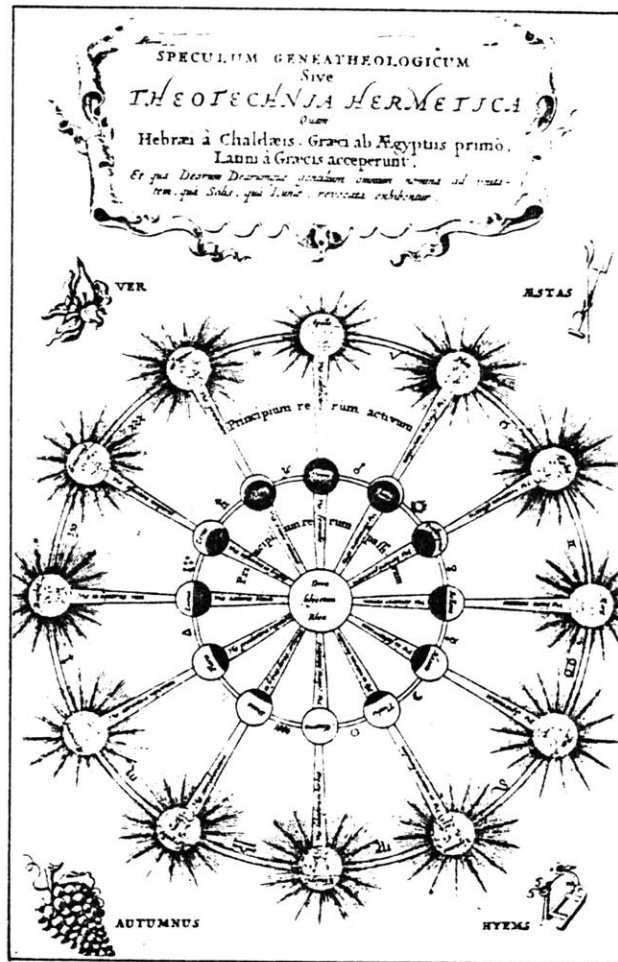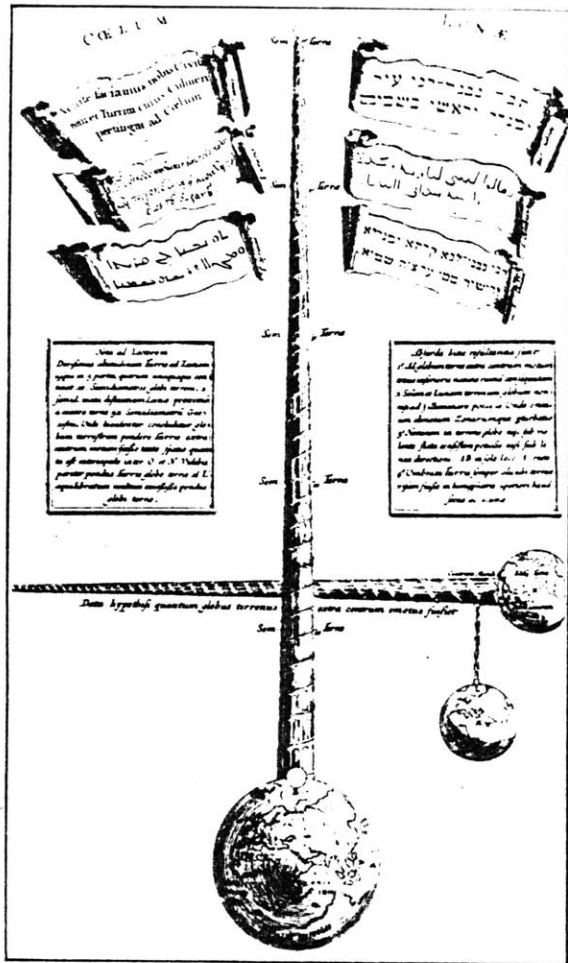
4. Athanasius Kircher, displacement of the earth's center of gravity by the Tower of Babel

Turris Babel, published in 1679. The Biblical account of the Tower of Babel, condensed in a few verses, provided little content, so the latter reconstruction was more ardous than the first. The basis of the mystical importance of the Tower for Kircher was that he believed it was grounded on the capital sin of pride and therefore a symbol of those who chose to remain outside the fold of the Catholic Church. The erection of the Tower by Nimrod, which Kircher assumed proceeded for a half a century, was based on ambition and pride and consequently could only end in confusion, as the Biblical account stated. Speculation of the height reached by the Tower had of course been attempted previously: St. Jerome had claimed it was 4,000 feet high and Philo argued that

11

its summit was 5,000 feet or 1,000 feet higher than the loftiest mountains on earth. Avoiding simple numerical estimates, Kircher set out to disprove that it was the celestial world the Bible was referring to when it stated Nimrod desired to reach heaven. He demonstrated through diagrams that to gain this height would have meant building a tower five times the earth's sphere, therefore displacing the center of gravity. He continued his interpretation with the claim that Nimrod, despite his pride, was probably the greatest architect that ever lived. This was demonstrated in his comprehensive understanding of the theories of architecture, matched only by his immense knowledge of its practical aspects. His organizational skills were displayed in the vast preparations he undertook for such an extraordinary endeavor: the numerous meetings with subordinates, coordination of multitudinous dimensions and careful selection of appropriate materials. His astounding technical capabilities were demonstrated by the procurement and operation of hoists, cranes, and other mechanical contrivances that certainly were marvels of engineering. Although he must have possessed exceptional intelligence and strength of character, he also lusted for power, was impious, cruel, and of unbounded rapacity. Worst of all, he spread idolatry among his subjects, causing them to build toward the sun. Kircher continued his analysis with a physical description of the Tower: it was circular in plan, helical in elevation, and shaped much like a cochlea. This type of structure lent itself well to the transportation of materials skywards. Kircher's depiction of the Tower through engravings was an influence on the later paintings of Pieter Brueghel.[4]

André Parrot, who has currently studied the meaning
of the Tower, states that the general approach to
the interpretation of the story in Genesis II has
been to seek a moral rather than historical truth.
Adopting a theological bias, a severe judgement is
often made on the motivations for undertaking such
an enterprise: by building their city and their
Tower with a success that is due to their being
united as one people speaking one language, the
Babylonians aroused the jealousy and wrath of God;
their achievement, which others may have copied,
was an intolerable threat that God suppressed with-
out hesitation, creating confusion and scattering
them. Later commentators have gone out of their
way to justify this severe condemnation, denouncing
the subtle paganism present in even the most reli-
gious being that wished to ascend to heaven by any
means available and force the diety to come down.
But Parrot believes that the Babylonians had no such
intention. If they were to be blamed for approach-
ing heaven to be near their gods, then we must also
condemn in the same way all of mankind's initiations
such as the towers of Notre Dame and the spires of
Chartres Cathedral. He states that the Tower of
Babel is the Cathedral of Antiquity or perhaps more
blameless, for at the time the Cathedrals were
built mankind had experienced a divine revelation.
In the third millenium before Christ the human race
was only feeling its way, their hands clasped in
prayer and their eyes raised towards the heavens;
although worshipping false gods, the essential step
to look beyond this world had been taken. Referring
to the purpose of the ziggurat, Parrot finds rein-
forcement for his premise: the Tower of Babel was a

13

stairway to heaven and the temple it supported was,
after all, a gate. [5]

Alexander the Great found the Tower a heap of rubble
in 331 B.C. when he entered the old metropolis of
Babylon in the course of a bloody, triumphant expe-
dition through Asia. The glamor of the city did not
vanish completely and its name was so highly regarded
that upon return seven years later, albeit with a
greatly reduced army, he decided to establish his
residence there, a new location from which to exert
his imperial influence. He ruled a half year longer.
In this short time, he hurried reconstruction of the
Tower, which he had previously ordered be started on
his first arrival. Twenty thousand soldiers and
workmen, essentially slaves, had to carry away the
ruins of Etemenanki and clear the building site,
but construction was never started. Alexander the
Great died on June 13, 332 B.C.: for Babylon this
meant the loss of its last chance to become capital
of the world as perceived in its time. Its promin-
ence began to wane, its population declined, its
palaces crumbled. From this point on little was
known of the previously flourishing desert metro-
polis.

The Babylonians had exploited the early construction
technique of mud brick and bitumen in their magni-
fication of the conventional ziggurat form to an
inflated scale, creating a structure higher than any
built previously, metaphorically impelling the
mountain summit, the gate of the gods, the city of
Babylon towards the cosmos. Though in accordance
with tradition it functioned typically as a step-

ladder for priests, the Tower of Babel was also an expression of a religious society that believed it was the locus of the world; it was a civic status symbol. Various interpretations put forward in the past and current scholarly speculation do not diminish, but only fuel the significance of the Tower; on a mythical level it will always represent the quintessential Tower of over ambition, arrogance and pride, the moral lesson for the hubris of mankind.
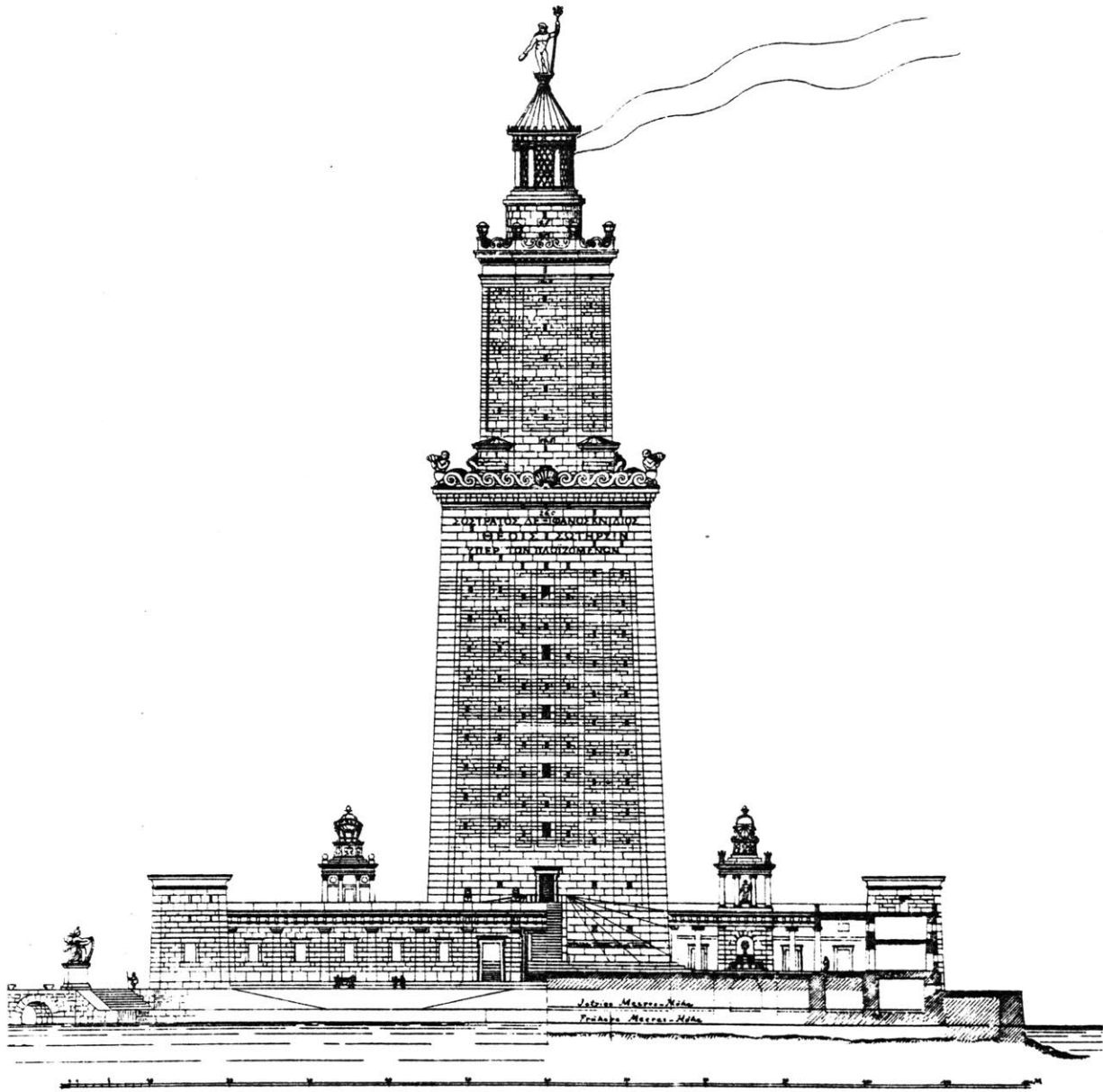
ALEXANDRIA: THE PHAROS

Founded by Alexander the Great in 332-331 B.C. and
planned by Dinocrates, one of his generals, Alex-
andria became the first city to bear the name of its
founder rather than of a god or mythological hero.
On a narrow neck of land between Lake Mareotis and
the Mediterranean, opposite the Island of Pharos,
the greeks had created their last and probably their
greatest city-state: the waning Egyptian capital of
Memphis and scattered minor villages became a back-
drop for this wealthy metropolis, the cross-roads
of three continents, and major commercial center
specializing in the trade of papyrus, glass, perfume,
ivory and silver. On the basis of such commercial
wealth under the dynasty of the knowledge-acquisitive
Ptolemies who assumed power after the death of Alex-
ander, Alexandria soon became regarded as the world
center of the sciences. Scientists had the first
zoological garden in history at their disposal.
Euclid, the father of geometry did his teaching and
research work at the Museum in Alexandria and Archi-
medes of Syracuse frequented it on a regular basis.
Eratosthenes measured the size of the earth and came
within fifty miles of its true diamter, Hipparchus
made the first attempt to catalogue and map the
stars and their movement across the heavens, and
Hero devised the first steam-engine. The historian
Strabo who visied Egypt about 25 B.C. reported what
he saw: the 100-foot-wide porticoed Canopic Street

5. Hermann Thiersch,
   Reconstruction of
   the Pharos at Alex-
   andria, elevation

17
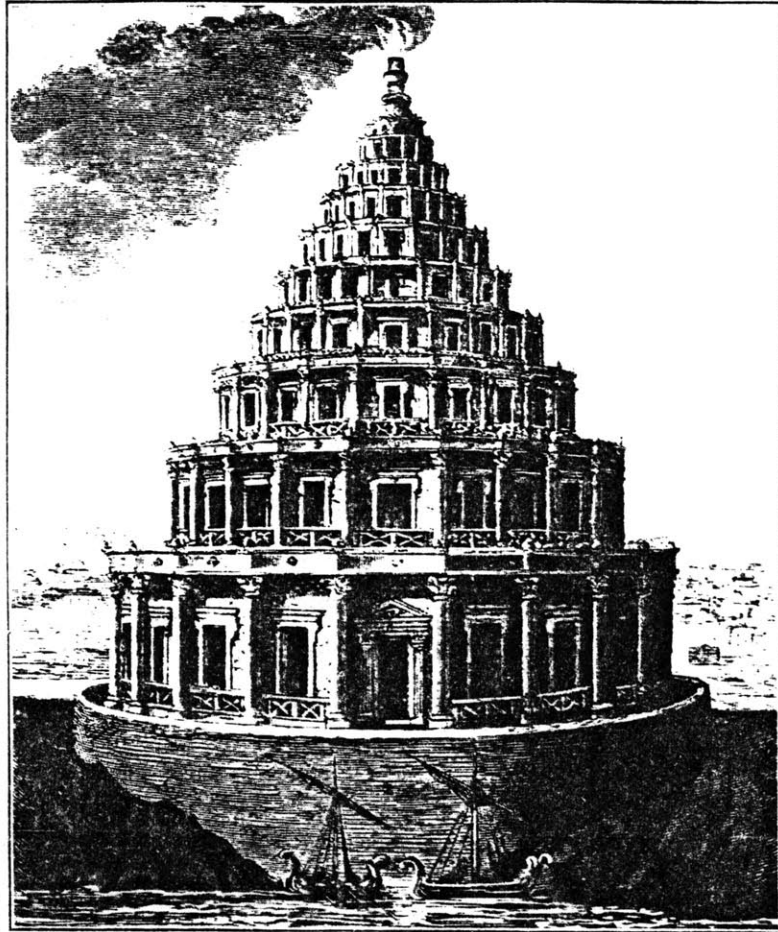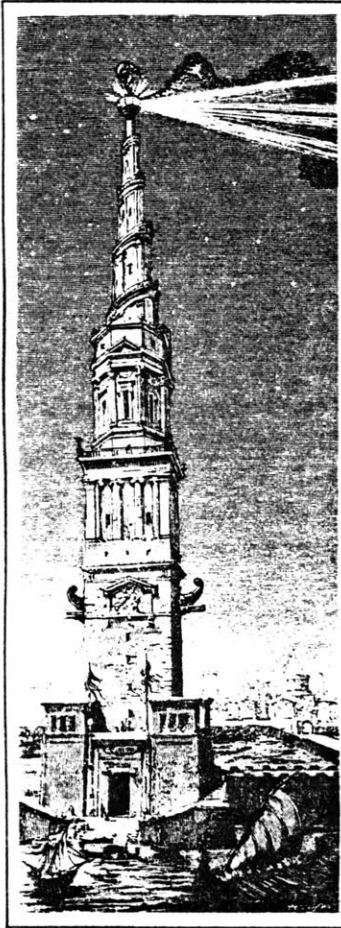
6. Early Reconstuc-
tions of the Pharos
at Alexandria

where the main agora and civic center were located,
two harbors, palaces, the Museum, two libraries, the
theater, the sacred temples Caesarion and Timonium,
and the prominent Pharos, or Lighthouses of Alexan-
dria. [1]

On the Island of Pharos, joined to the city of Alex-
andria by a dike about 900 feet long, the great Pharos
was built between 283 and 247 B.C. by Sostratus of
Cnidus. Planned by Ptolemy I Soter and inaugurated
by Ptolemy II Philadelphos, it was dedicated to the
Savior Gods on behalf of the navigators. It initially
functioned as a daytime landmark until the first
century B.C. when it was converted to a lighthouse.
According to a survey made by Ibn al Shalikh of
Malaga who lived in Alexandria in 1165-66, the

18

7. Ancient Alexandria,
plan
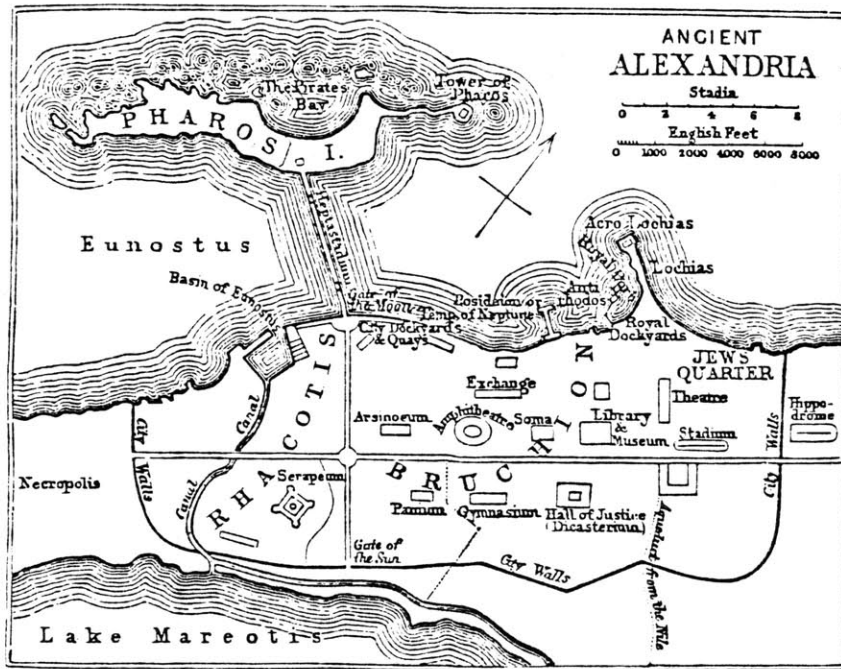
tower stood on a vast massive masonry platform about
350 feet square and 25 feet high that acted as a
barrier against the sea. From the center of the
platform rose the first section of the tower,
measuring about 100 feet square and 230 feet high,
containing a wide internal stair and fifty chambers
housing offices and military barracks. From a plat-
form at the top, the next stage rose 115 feet in the
form of an octagon 55 feet across the that housed
two stairways; above this was a cylindrical section
containing the lantern about 30 feet in diameter and
85 feet high. At the time of this survey, the
original top that had supported a statue of Poseidon
had been replaced by a small mosque from which
apparently a light signal was still displayed. In
its original form it was probably about 450 feet
high, only 20 feet lower than the pyramid of Cheops.[2]
Reconstructions by Hermann Thiersch show it exter-
nally to be a heavy, closed structure, regularly
punched with small deep voids at the office levels,
its massiveness articulated with columns and
piers and softened at the edges with ornamental

GRUNDRISS DER
LATERNE.

GRUNDRISS ÖBER
DER 2. PLATTFORM.

GRUNDRISS ÖBER
DER 1 PLATTFORM.

GRUNDRISS DER 12.
FOLGENDEN STOCKWERKE.

GRUNDRISS DES 1.
HAUPTSTOCKWERKS.
GESCHNITTEN NACH A-B.

A-   -B

20
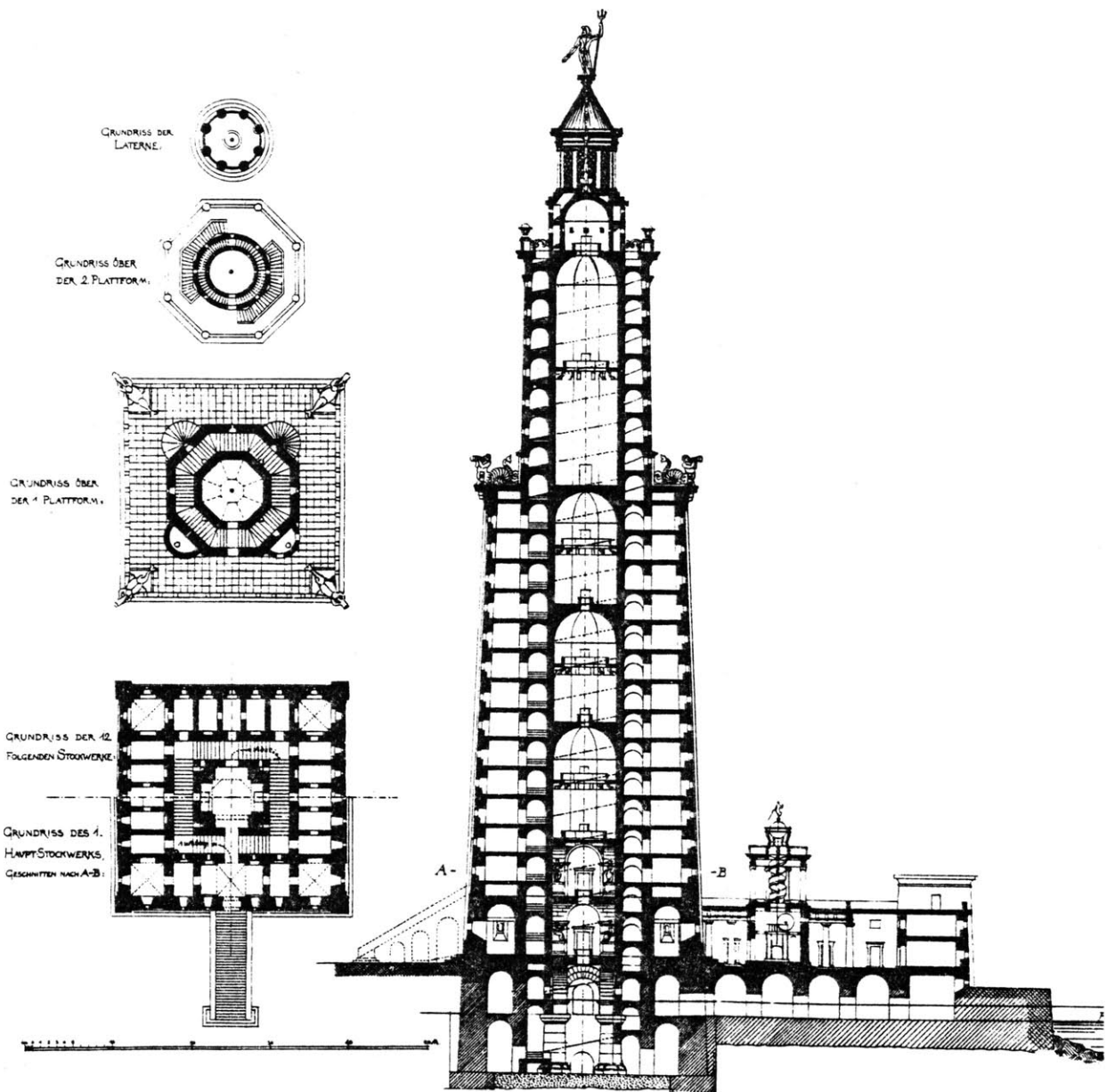
vestiges of Greek culture denoting a veneration of
the sea. The importance of the immensity of this
structure cannot be overestimated: constructed of
fired brick and faced with marble, it was the tallest
roofed tower ever built until eclipsed by the steel-
framed skyscraper of the early 20th century.

Although Alexandria is the first lighthouse for which
a written record exists, it does not mean that there
were no earlier ones, as it is unlikely that a
building so magnificient and so successful would have
been a prototype. Another lighthouse, Aegea, in
Eastern Cilicia, was represented on a Syrian coin in
197-64 B.C. At about this time lighthouses must have
become a familiar sight in coastal cities as indicated
in a description given of the Pharos at Alexandria by
Pliny in A.D. 77, translated in the sixteenth century:

> "the use of this watch tower is to shew light as
> a langhorne and give direction in the night season
> to ships for to enter the haven and where they
> shall avoid barrs and shelves; like to which there
> be many beacons burning to the same purpose, and
> namely at Puteoli and Ravenna." [3]

Representations of these fire beacons have been dis-
covered on medals and coins, bas-reliefs, lamps, vases
and other period objects: The lighthouse had become
a symbol of seaports. A Roman bas-relief, now in the
Vatican museum, shows a number of figures personifying
marine cities and recognized as such by the association
of each with a lighthouse. [4]

After Rome acquired greater power as the capital of
the Empire, Alexandria was still able to exert a

8. Hermann Thiersch,
Reconstruction of
the Pharos at
Alexandria, section,
plans

21

tremendous influence on the formation of major policies. It retained its commercial and intellectual status and became known as the greatest trade center in the world. At Alexandria, Vespasian had himself proclaimed emperor in 69 A.D., and following him a long train of emperors contined to frequent the city. It began its decline when Caracalla, who ruled from 211-217 A.D., having been mocked by the citizens, proceeded to massacre a number of its youth. It continued to suffer a slow decline similar to that of Babylon: today its site is a mass of ruins.

The Pharos lasted for over a thousand years until destroyed by an earthquake in 1375. On a practical level it had functioned originally as a signpost and later as a lighthouse; one can also assume that the offices and barracks were utilized on more than an occasional basis. But the immensity and grandeur that led to its designation by the people of antiquity as one of the seven wonders of the world was not required to fulfill everyday uses such as these. Like other lighthouses of the time it was a symbol of a seaport, but surpassing the Tower of Babel, it additionally became the tallest tower ever constructed. Perhaps for its learned creators the erection of the lighthouse was the exercise of a technical possibility, another scientific experiment. Nevertheless, it can only be inferred that the Alexandrians had enhanced the expression of civic pride that had its beginnings in Babylonia: the Pharos was intended to be a landmark that celebrated and propagated the magnificicence of Alexandria as the commercial and intellectual pivot of contemporary world culture.

24
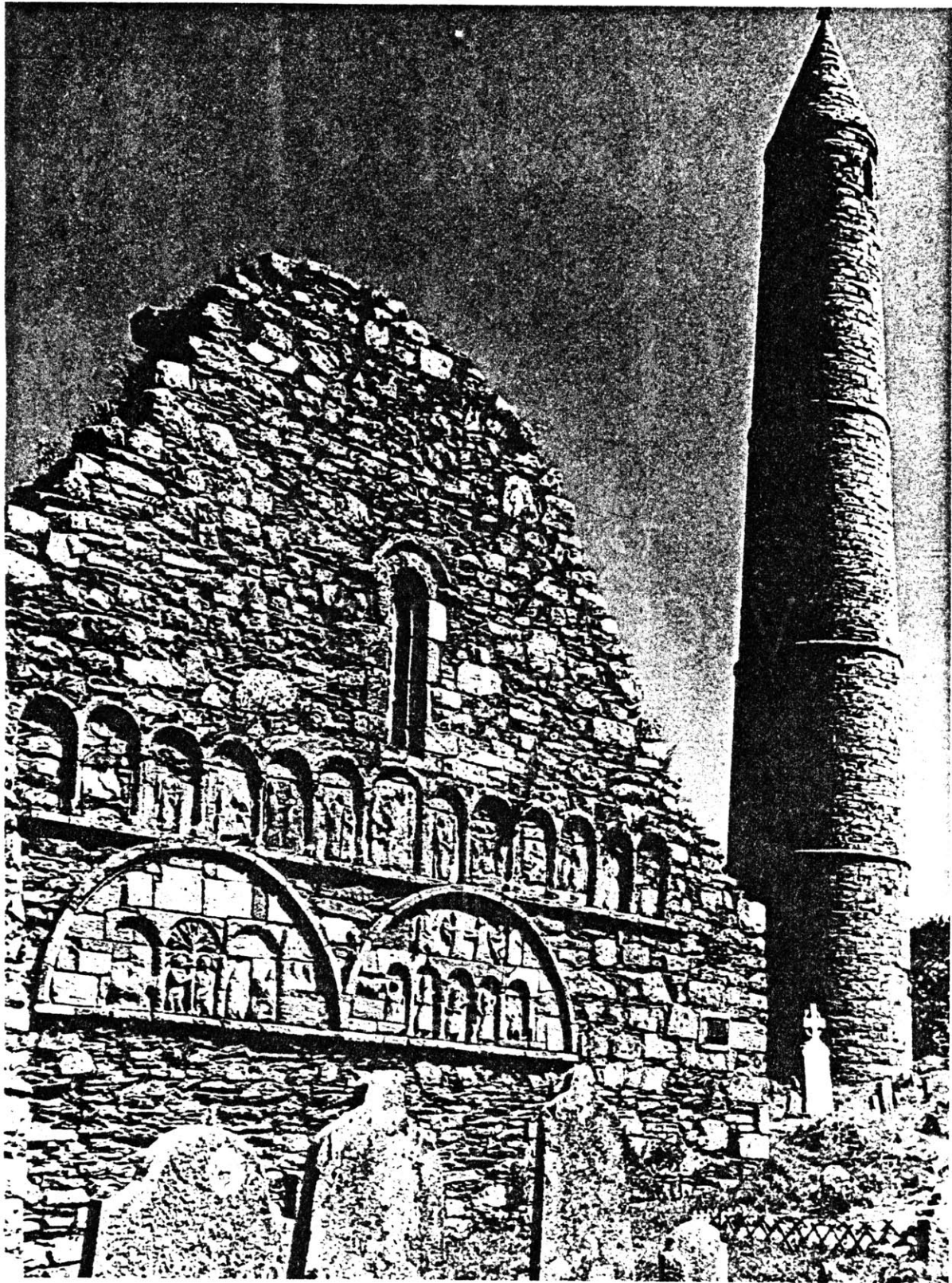
ROUND TOWERS

The Romans exerted their constructional daring with
the erection of amphitheaters, triumphal arches, and
temples to their gods. Their version of the tower,
the stubby turres, appeared as an articulation in
palace and fortification design, but as builders they
refused to aspire skywards. However, with the devel-
opment of Christianity there were unprecedented
social requirements for architecture; within this new
context the tower would make a highly significant
original contribution to Early Christian design. By
the sixth century towers became established as
important ancillary elements in church architecture.
Their demand as functional components of an ecclesi-
astical establishment can be traced to two contem-
poraneous early developments. First, bells were
introduced into church services in the fifth century
and within the following century became popular with
ecclesiastics and the public, leading to the inevi-
table development of a belfry integrated in the body
of the church. [1] Second, when persistent and repeated
attacks of the barbarians necessitated the construc-
tion of fortifications, the early towers that had
initially been built adjacent to Syrian churches for
purposes of defense were renewed in continental
Europe near ecclesiastical establishments, the most
substantial and capacious refuges. [2] The initiation
and increasingly widespread use of the tower marked
an acknowledgement of verticality in church building

9. Waterford, Ireland,
   west front of cath-
   edral and Round
   Tower

25

which became characteristic of Early Christian
architecture and appeared at its culmination in
Gothic architecture where every soaring line of
structure followed the vertical impulse.

Prior to the fifth century there were probably Chris-
tians in Ireland, but St. Patrick can be attributed
with the spread of Christianity and the resulting
establishment of contact with Gaul and, in all proba-
bility, Rome. But from the middle of the fifth
century until nearly 150 years thereafter, due to the
advance of the English into Britain from the east and
south and barbarous invaders from Gaul, Ireland
became isolated from the influences of central and
southern Europe. Outside the Roman sphere of
conquests, it did not have to confront the inclination
to adopt the Roman methods of building; consequently
its architecture, like its culture, continued indig-
enous forms. Later renewed communication with
England and continental Europe, primarily through the
travels of monks, did not prompt the Irish to give
up their native style of construction. The vast
majority of the buildings of Ireland, including
churches, were made of wood although some were con-
structed of stone without mortar. For reasons of
protection from the weather and foreign invasions,
and as a result of the increased contact with contin-
ental Europe, an evolved method of stone and mortar
church building developed. The first mention of an
authentic stone church was made in 789. Shortly
thereafter, the earliest Round Towers were const-
ructed.
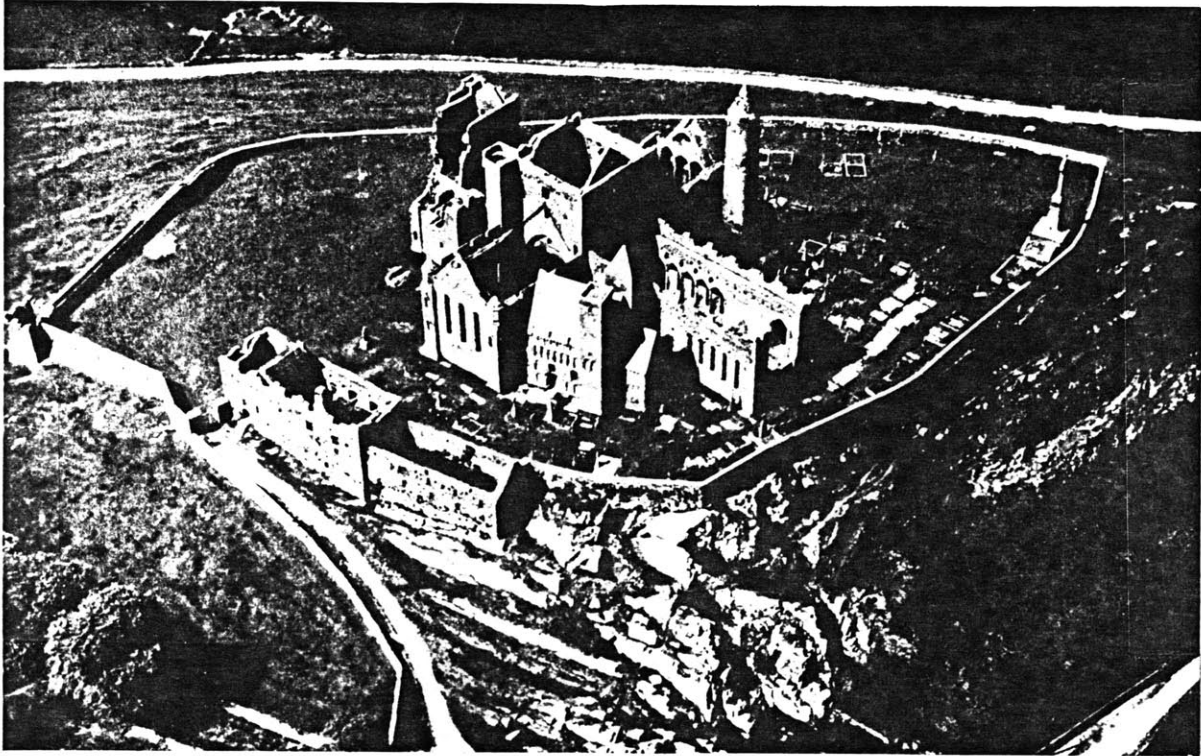
10. Ireland, Cashel of
the Kings

It has been suggested that the tower type reached
Ireland through Brittany. Both were simultaneously
subject to Norse invasions so it is not surprising
that both should adopt a similar method of protection
and defense. Towers resembling the Irish Round Towers
no longer exist on mainland Europe probably because
they have been almost wholly destroyed or replaced
by later towers. Viollet-le-Duc attributes the
origins of the detached cylindrical towers to the
Eastern cylindrical pillar, perhaps the result of
an influx of Byzantine workmen into Northern Italy
to the Court of Charlemagne in the late eighth century.
Remaining examples of these influences in Europe are
typified by the towers of S. Appolinaire in Classe
and S. Apollinaire Nuovo in Ravenna which were
constructed within a century after the first Round
Towers appeared and were to become precedents for
later elaborations such as the campanile at Pisa,
where the tower type was merged with the local deco-
rative marble arcade. Only the oldest and simplest

27
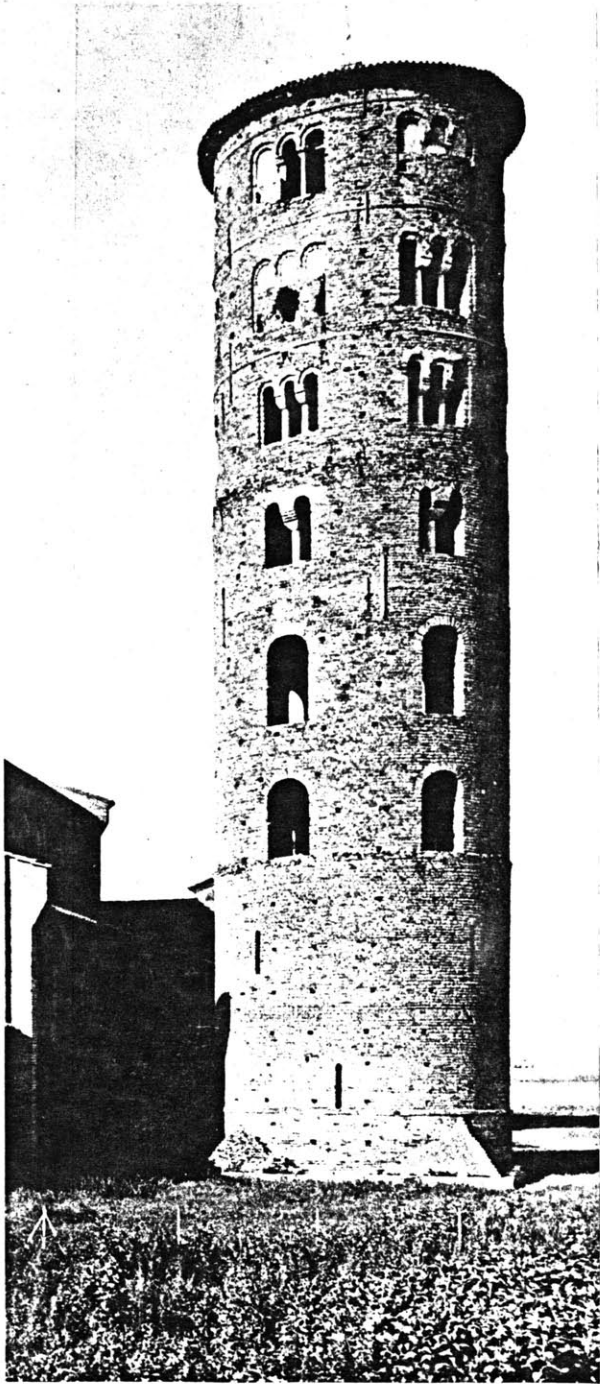
examples of this tower type exist in Ireland, as
indicated in the fundamental quality of the cylin-
drical stone form and the primative conical stone
roof. [3]

Considered the most poetic of all Celtic architectural
creations, the graceful, tall and delicately tapering
Round Towers embody the coarseness and bravura of
Northern design. Varying in height from 50 to 125
feet and in diameter at ground level from 14 to 16
feet, they rise from a base consisting of a double or
triple plinth. The wall is thickest, approximately
four feet, at the base of the tower and it diminishes
in thickness as the tower, with height, diminishes
in breadth. Including the floor level at the doorway
elevated high above the ground, they contained four
and often more stories as indicated by offsets, cor-
bels and stair holes for joists. The floors and the
spiral stair connection between them were constructed
of wood. In almost all cases, one window occurs at
each floor level, except at the highest level where
there are generally four windows, often oriented in
the direction of the cardinal points. The tops of
the doorways are flat or semicurcular; the windows
have flat, round or triangular heads, however what is
semicircular outside is sometimes square inside and
a head triangular externally may be internally semi-
circular or square. Jambs at openings are inclined,
but not splayed. The tower was intended to end with
a conical stone roof, but in later periods battlements
were substituted or in many cases roofless towers
were left to deteriorate at the top. With few
exceptions, they stand isolated from accompanying
ecclesiastical structures.

11. Ravenna, S. Apol-
    linare in Classe,
    campanile

29

As other venerable monuments, the Round Towers were
an inspirational source for the exuberant antiquarian
imagination. Some claimed they were embedded deeply
in antiquity and therefore pagan. Some speculated
that they were perhaps tombs, fire temples of Persian
origin, Buddist temples, temples of Vesta, astro-
nomical observatories, or minarets from which to
proclaim Druidical festivals. Others believed they
might have been first built by the Danes, or were
intended to be anchorite pillars, or penitential
prisons. Substantiation for this type of myth-
making was often based on unfounded assumptions, mis-
translation of false etymology, misquotation of
existing works and quotation of imaginary works.

A more scholarly approach to the interpretation of
the fundamental purpose of these towers was taken by
Arthur Champneys in Irish Ecclesiastical Architecture.
First, he claims, the towers were ecclesiastical.
They were invariably associated with a church or
group of churches to the west or northwest of the
church entrance door which faced the door of the tower.
Second, they were used for defense purposes, or as
refuges into which the monks or clergy might flee
taking with them their books, relics and church plate.
A conclusion such as this one may be suggested by the
mutual orientation of the church and the tower doors,
but it is substantiated by the fact that the tower
door, or double doors, secured by iron fastenings, was
raised 6-10 feet above the ground, accessible only by
ladder. Additionally, openings were provided at floor
level for dropping stones or shooting arrows at
besiegers and an opening was provided above or beside
this tower door, probably for a similar purpose:

30

persons trying to force the church door would become victims of the arrows shot from this window or the doorway. The greatest weakness of the tower when needed for defense was the susceptibility of the exposed wood on the interior to fire, although fire-gutted towering masonry shells often continued to function as places of refuge. A third purpose of the tower was its function as a <u>cloicthech</u> or bell-house. The topmost level with its many openings was ideally suited to this use. Fourth, according to Viollet-le-Duc, they were used as watchtowers, a reasonable supposition, because from their heights it was possible to command a wide, distant view overtopping the low rises of the earth. Also, the upper windows occasionally corresponded to the approach roads of the monasteries. Fifth, the tower was intrinsically a landmark designating a church or monastery. Accor-ding to Viollet-le-Duc, it was likely that a light would be placed in the top windows at night, as was the custom in smaller towers in French cemeteries. Finally, although it may not have been a deliberate intention, the Round Towers provided unity to the ecclesiastical establishment over which they presided. Standing isolated they were nevertheless an integral piece in the grouping of churches and other small related structures, usually surrounded by an enclosure.[4]

When it was discovered by the Irish that a belfry, watchtower and keep were necessary and when war and pillage demanded a symbol of pride and power in Irish Christian architecture, a lofty stronghold was raised adjacent to the cottage church, often lifting the cross high on the conical roof, a beacon for

Christians, a warning to invaders. Eastern influences had made their way across the continent to the remote northern island where with the development of stone and mortar construction the Round Tower had its primitive beginnings. It was probably this primitive quality when contrasted with contemporary architectural conventions that fueled later mythological and mystical associations, some of which remain today, despite the attempts of historians to unravel the complex layering of attributions the towers have unceasingly accrued with time. Less a declaration of ambition and pride and more an elegant assertion of practical needs, the towers reigned delicately over the low undulations of the Irish landscape, as quiet but assertive reminders of the significance, solemnity and growing presence of the early Christian Church.

0   20   40
m.
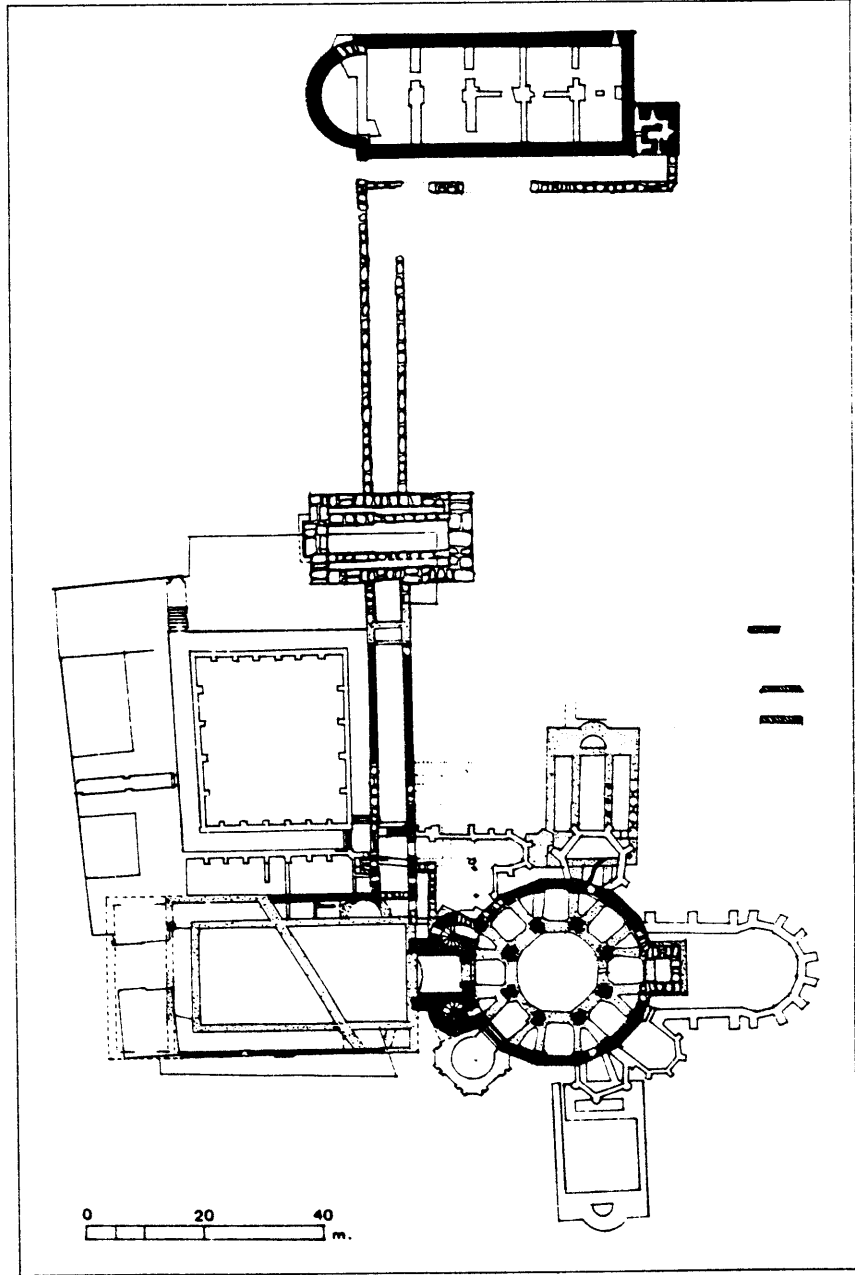
AIX-LA-CHAPELLE: THE WESTWORK

Prior to 800, the majority of early church buildings were built east of Italy and on the shores of the Mediterranean: Western European building at this time was generally a provincial adaptation of Roman architecture. Construction slowed as barbarians invaded the crumbling Roman Empire, at the time in the process of transforming into the Western European system of nation states. In the seventh century a new church architecture began to emerge that depended no longer on Roman Imperial practice, but on ancient themes reinterpreted by new economic conditions and the social practices of new populations. [1]

Church buildings in Western Europe prior to the reign of Charlemagne were small compared to Roman basilicas or Byzantine churches of the same period. Even in Rome building had practically come to a standstill and the popes of this time, better known for their elaborations and formalizations of the liturgy, chose to restore existing buildings opposed to creating new ones.

With Charlemagne, a new period of building activity was initiated. Pepin the Short, who had defended Christendom from Germanic tribes to the East and the Moors across the Pyranees, displaced the reigning but decaying Merovingian dynasty with new territorial claims, consequently gaining recognition from the

12. Aix-la-Chapelle, Palace and Chapel, plan

35

papacy through the elevation of his son Charlemagne
as Emperor in the year 800. With this coronation,
a new status of Holy Roman Emperor, Emperor of the
West, was accepted and recognized by the Byzantine
Emperor, and an axis was set up between the papacy
in Rome, the seat of Christian spiritual leadership,
and its new secular protector. This axis was to dom-
inate European affairs prior to the Reformation when
it waned in force until the abdication of the last
emperor in 1804. Determined to express his combined
orientation towards ecclesiastical and cultural
matters in the establishment of a new built environ-
ment, Charlemagne turned to Constantine the Great,
the Roman Emperor who was later considered the arche-
type of the Christian ruler, and became determined to
make his court a cultural center that rivalled the
Byzantine Emperor's court. Byzantine planning,
exemplified in San Vitale in Ravenna, a Byzantine
outpost and former imperial capital, was echoed in
Charlemagne's most ambitious of church buildings: the
octagonal Imperial Palatine Chapel at Aix-la-Chapelle.
Although it additionally expresses the influences of
a number of octagonal buildings in lands surrounding
the Mediterranean, Aix-la-Chapelle was a building of
its own time. It was smaller than San Vitale, and
differed in character from Hagia Sophia, another
suggested influence, and lacking the spatial compli-
cation of the former, instead it possessed similar
qualities of smallness and solidity found in contem-
porary ecclesiastical buildings. The major surviving
monument of Carolingian architecture, Aix-la-Chapelle
has been suggested as the basis for the contrivance
of the westwork, or as the "key" to the westwork
question. [2]

13. Aix-la-Chapelle, Chapel, axonometric projection with reconstruction of west front
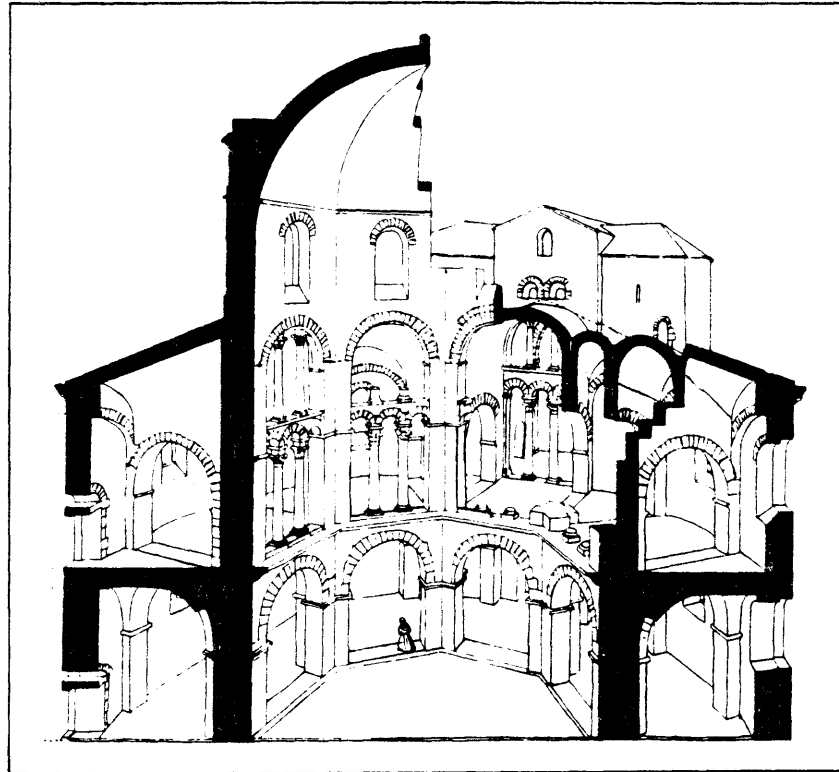
Architecturally, the westwork is considered a type of tower construction; in medieval writings it was referred to as a _turris_. The tower, from Carolingian times onward was one of the most impressive elements of medieval architecture. In ecclesiastical building it was found alone, in groups, or more characteristically incorporated into the structure of the church. As a constructional form the westwork was new and unique, a creation in its own right as opposed to an imitation of antiquity. From readily available precedents, the Carolingians adapted their own versions of such elements as columns and vaults and of spatial organization such as the basilica, investing these forms with a new meaning expressive of their cultural values. Judged today as one of the most significant phenomena in earlier architecture, scholarly controversy surrounds the significance and function of the westwork structure as a whole. In a description of St. Riquier it was claimed that monks and novices received communion at Easter and Christmas during

mass in the "upper west" portion of the church
although the function of the vaulted ground floor was
not clear. Perhaps westworks had various liturgical
functions and significance related in some way to
their dedication, an attribution governed by the
relics they contained. [3] The association of the
altar with a relic was a fundamental problem in Early
Christian church design; it was considered an eccles-
iastical rule that every altar should contain a relic
shrine of one or more martyrs. The conflation of
the martyrium and the eucharistic church created the
new planning problem of providing access to the
relic to a large number of worshippers in such a way
as to avoid interference with the celebration at the
high altar. With the multiplication of relics and
martyria, altars were no longer confined to the
eastern end of the nave nor even the eastern exten-
sions of the church. Altars were also added to the
western end, the major martyia acquiring the char-
acter of independent "churches". [4] Other speculation
centers on the role of the emperor. It has been
postulated that the westwork was the seat of the
emperor in the course of his travels, or was under-
stood as a church reserved for the emperor. These
two premises may be viewed in a joint relationship
to one another since it is possible that the emperor
and his entourage could have made use of the west-
work from time to time for their own purposes, though
the function may have been primarily liturgical.
Additional suggestions regarding the function of the
westwork include a parish church, baptistry, seat of
judgement, symbolic or operational fortress, mauso-
leum, and a royal chapel or in the case of later

westworks a loggia in imitation of the Palatine
Chapel at Aix-la-Chapelle. [5]

The Chapel was part of an ensemble that also con-
tained the Palace and an Audience Hall; the entire
group was reminiscent of the Lateran Palace in Rome.
In addition to the Byzantine characteristics expressed
in the Chapel, such detailed considerations as the
designation of the Audience Hall as the "Lateran" and
the erection of a statue of Theordoric the Great,
alluding to similar monuments found in Constantinople
and Rome, reinforced the importance to Charlemagne of
the model of Constantine as the archetypical Christian
ruler. Located on the southern end of the ensemble,
the Chapel was the climax of a vast composition that
measured about 300 feet on the principal and trans-
verse axes. At the western extremity of the main
axis there was an entrance into the Audience Hall.
It contained galleries on two levels and was dominated
by the monumental westwork facade of the chapel.
Here the emperor would make appearances in a tribune
to a potential crowd of 7000 people. The cylindrical
turrets of the westwork housed spiral staircases that
rose up to a throne room at the tribune level and
continued higher to a small reliquary chapel where
Charlemagne housed an extraordinary collection of relics.
Between the west towers on the exterior there was a
tall recess forming an apse-like configuration that
addressed the audience hall. The westwork connected
the Chapel at the tribune level with the court and
the Palace. An annular gallery extending in both
directions from the throne, divided from the large
octagonal central space by a columned screen, joined
it to a sanctuary situated on the opposite side of
the Chapel. At the ground level the same annular

aisle embraced the central space of the church,
connecting the deep porch entrance of the westwork
to a sanctuary opposite the entrance and located
below the upper sanctuary.

The westwork at Aix-la-Chapelle, though differently
proportioned, is partially dependent on the narthex
of San Vitale. Flanking this narthex are two round
stair towers, one of which was extended upwards to
form a cylindrical belfry when Benedictines took
over the church in 910, indicating that initially
these towers, like the towers at Aix-la-Chapelle, had
originally served as a means of vertical circulation
rather than as belfries. [6] The motif of the twin-
towered basilica facade had been known in the sphere
of influence of Constantinople as early as the fifth
century, where twin-towered palace gates had been
understood as symbols of rulership. [7] The pair of
pylons located at the entrance way to the exterior
propylea of the late classical temple of Baalbek
constructed in the first and second centuries were
inherited by a basilican church erected in its main
courtyard, the first church to possess a truly monu-
mental entrance way. It was this precedent that was
probably followed, although much less conspicuously,
in the fifth century facades of Syrian Early Christian
churches such as the church at Qalb Lavzeh. [8]
Although there may have been continuity in the idea
of paired towers as a symbol of rulership, the Syrian
scheme of towers hardly affected early Western church
architecture. The development of imposing Romanesque
facades occurred as a separate sequence; prior to the
development of adequately sized bells, there was
virtually no use for towers on church facades, a

40
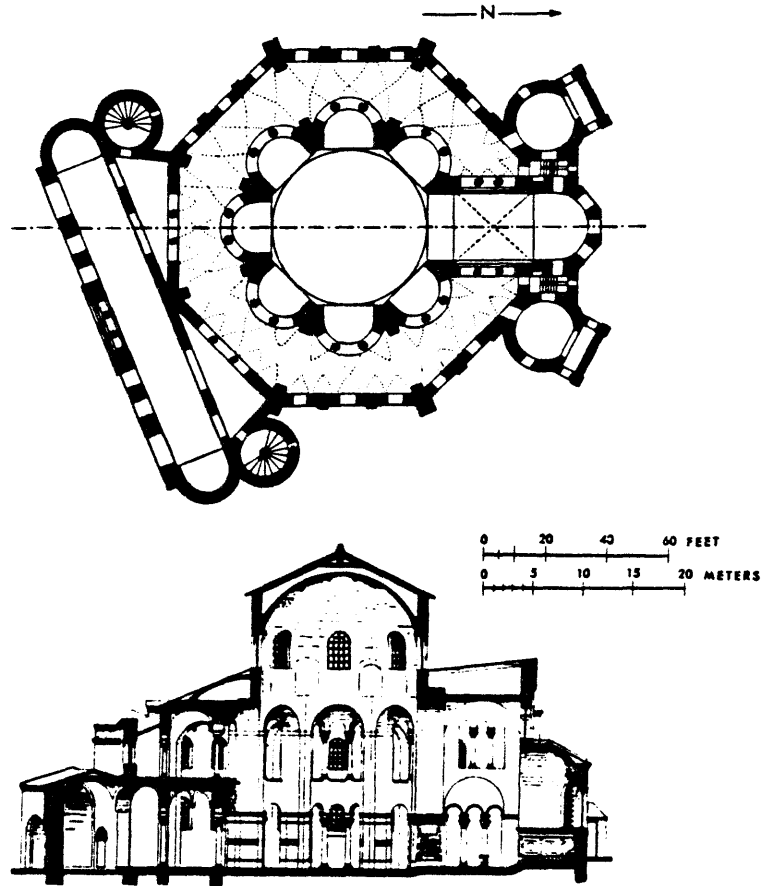
14. Ravenna, S. Vitale, plan and long- itudinal section

probable explanation for the late appearance of great towers after the Syrian scheme was discontinued. [9] Prior to the construction of the belfry at San Vitale, Benedictine monks had built some of the earliest known square belfry towers that were actually vertical extensions of the veritable Roman turres integrated into the construction of the church. The earliest towers of this type were not systematic in their location with regard to the church and probably had little relationship to the development of the Romanesque facade. [10]

Through an understanding of the westwork, one is able to grasp the transformation of Carolingian ideas into Romanesque forms: the triple-towered west front as well as the twin-towered facade were already present in the westwork of the Aix-la-Chapelle where one

41

finds the essential elements of the square central
tower structure and the two symmetrical round stair-
case turrets. In the Ottonian age the figure of
Charlemagne had assumed a stature equal to Constan-
tine's, leading to a revival of Carolingian motifs in
"copies" of Aix-la-Chapelle, such as the Minster at
Essen constructed in the early eleventh century.
Here a curious half-hexagon with galleries strongly
resembling a fraction of the Palatine Chapel was
built as a west front. [11] Above it stands a square
facade tower framed by two stair turrets, a startling
deliberate juncture of the facade of Aix-la-Chapelle
with a basilican church forming a triple-towered west
front. It has been called a "classic example of
Ottonian 'interpenetration'." [12] The later west
front of the abbey church of Nortre-Dame at Jumiéges,
located just outside the vague boundry lines of the
Ottonian realm and constructed in the second half of
the eleventh century, shows instead careful assimi-
lation of westwork components. Extended in height,
the stair towers have become lofty belfries. The
disposition of the interior spaces is suggestive of a
westwork and it is apparent that the facade with its
projecting center portion is an extension of an
earlier westwork "tower" structure, but the result in
its entirety is an Early Romanesque twin-towered
facade. [13] The motif of the twin-towered Romanesque
facade, essentially a transformation of the Carolin-
gian westwork, was to find later modification and
elaboration in the facade of the Gothic cathedral,
just as the predilection for towers that first
appeared in the Carolingian westwork was to reflect
the aspirations of Romanesque and Gothic architects
in the agitated skyline of the Medieval town.
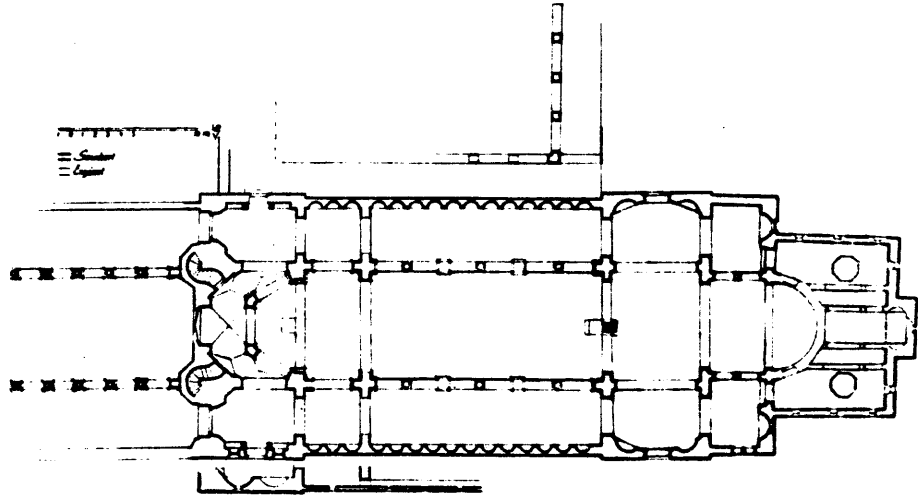
15. Essen, Minster,
    plan and longitu-
    dinal section
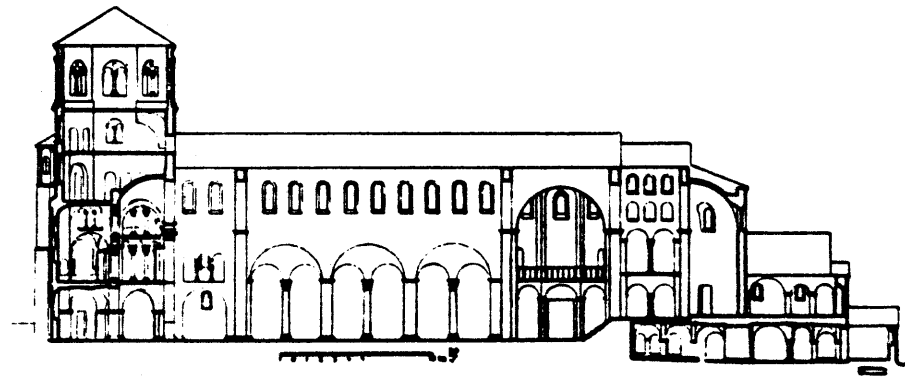
In their adaptation of conventional forms from anti-
quity to suit new demands, exemplified the westwork,
the Carolingians initiated a renaissance verified not
only by an acknowledgement of its classical origins,
but in its indisputable influence on the succeeding
Romanesque period. The development of the twin-
towered facade with its lofty belfries from the early
westwork of Aix-la-Chapelle flanked with its rudimen-
tary cylindrical stair turrets ascertains such an
influence. The utilitarian function of vertical
circulation in the cylindrical towers adjacent to the
entry structure of the early westwork was aggrandized
with the additional demands of the belfry. As the
Romanesque tower increased in substantiality and
ascended skywards, incidental conveniences suitable
to the nature of the lofty, closed, massive structure,
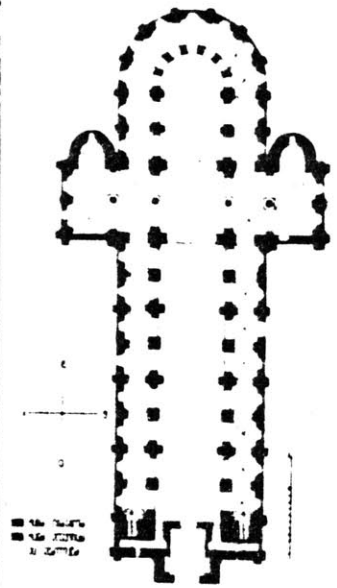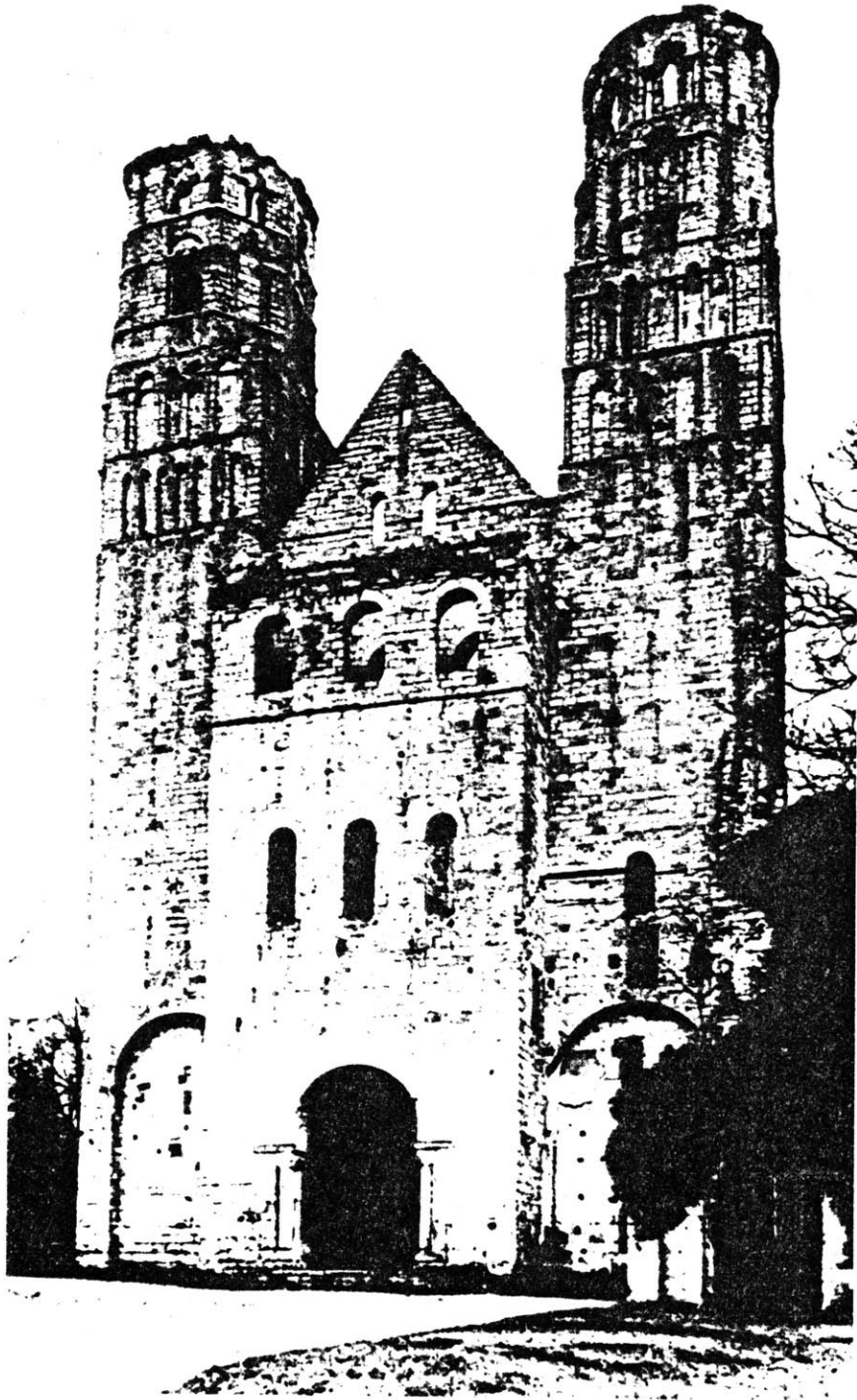
such as its adaptability as a watchtower or defense
fortification, became useful secondary advantages.
Much more captivating is speculation regarding the
purpose of the westwork in its cultural context.
Aix-la-Chapelle in particular embodies the precarious
balance between church and state characteristic of
the Carolingian and Ottonian Empires. Surrounded by
a dispersed configuration of nation states, it became
a hall of state conveying the ambience of an Imperial
sacrum palatium, reflecting the concept of earthly
rulership. [14] The direct borrowing by Charlemagne
of symbols of authority from Constantinople, Ravenna
and Rome, including the venerable twin-towered
entrance way for the Chapel with its deep history as
a temple, palace, or church front, verifies the
importance of the legitimization of his recently
vested power. Soon afterwards, his imperial authority
was organized through the division of pagan lands
and the appointment of suitable bishops to each
territory and in the reformation of the large inde-
pendent prevailing Gallican church into a Latin one,
facilitating the establishment of the new liturgical
framework that presented the architectural problem of
the compound martyrium. The most common, but complex
interpretation of the westwork expression as a seat
for the emperor and as an architectural accommodation
of new liturgical requirements, in addition to its
set of rich and diverse additional ascriptions is

16. Jumiéges, Nortre   a reflection of the hybrid form of sovereignty
    Dame, facade and
    plan   embodied in the inseparable entity of the emperor

and the universal Church.
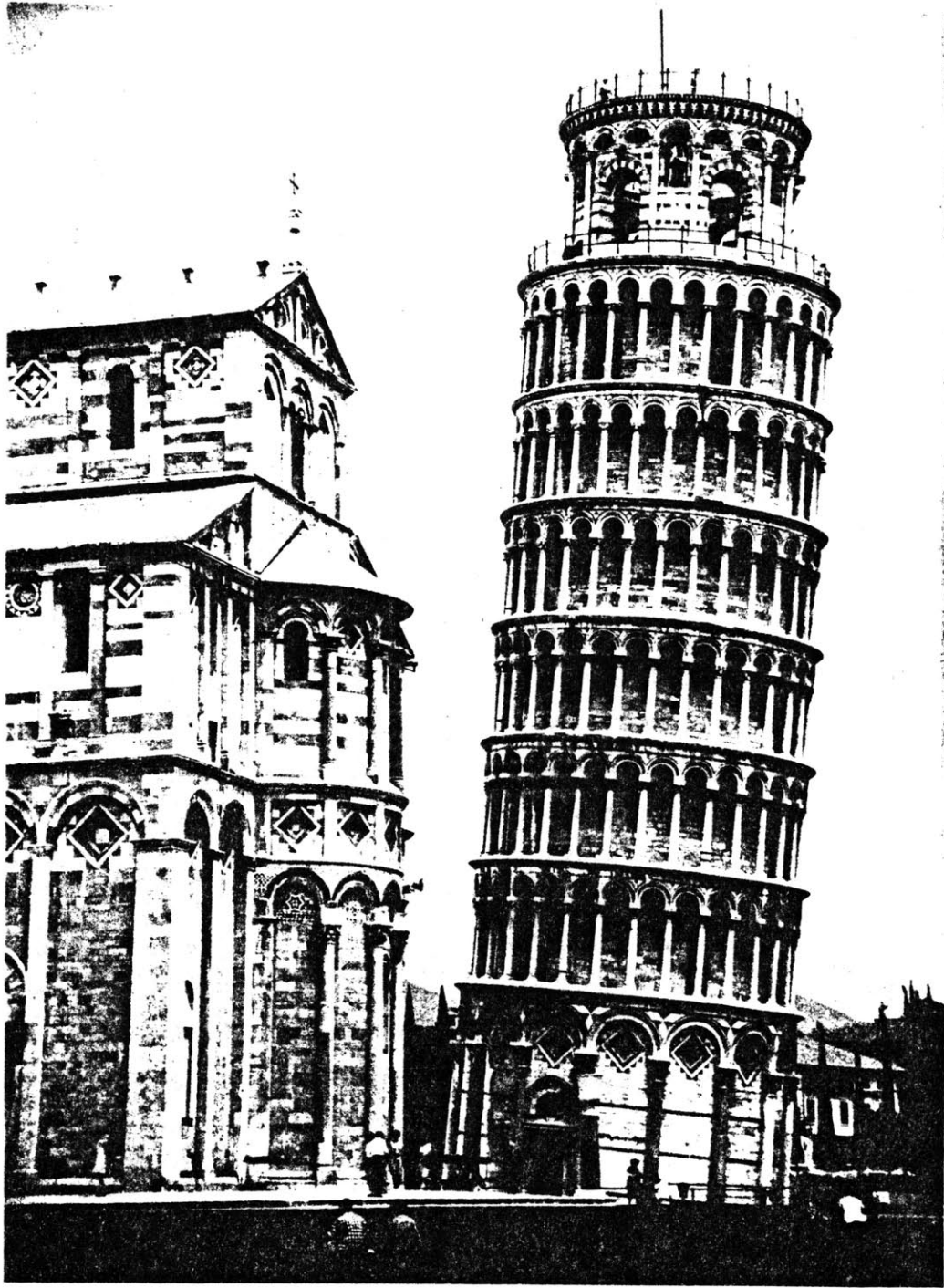
PISA:
THE CAMPANILE

Countess Mathilda (1046-1115) was well-remembered in
northern Italy as an energetic papal political figure,
an enlightened ruler, a bibliophile, and a patron of
the arts. She encouraged the development of the
Lombard towns, including the schools of Bologna, then
among the greatest in Europe, where advancements were
being made in civil and common law and in medicine.
Considering the Roman-mindedness of the sovereign,
it was not surprising that Romanesque architecture
should flourish in her domain and it was no less
natural considering the active artistic climate of the
period, that creative differentiations should appear,
as they did at Florence and Pisa. Local architects,
endowed with a sense of the classical, able to profit
from a tradition of fine workmanship, provided with a
good source of building stone and the means to
utilize readily available marble, placed an indivi-
dual stamp on a number of fine buildings, particu-
larly churches. In 1063, the Pisans laid the founda-
tions for their church on an open site where the free-
standing baptistry, the Campo Santo, and the tower
later joined it, creating a fine display of juxta-
posed marble panelling, arcading and colonnades, one
of the most splendid examples of grouped cathedral
architecture, a major achievement of the Tuscan Roman-
esque school. [1]

17. Pisa, the cam-
    panile and the
    Duomo transept

The twelfth century was an age of tower building.
Innumerable tall structures crowded the towns of
northern and central Italy, among them the campanile
of St. Mark's which had been successfully completed
in 1155. Not to be outdone, Pisans resolved to raise
the campanile for which their cathedral had long been
waiting, vowing to make it so splendid that the tower
of the rival city of Venice should pale before it.
Over the course of a year foundations were dug to vast
depth and innumerable piles were driven. In August
1174 the first stone was laid and Bonnano, the first
architect, began construction on the tower. When a
height of forty feet was reached, it became apparent
that one side of the campanile was sinking out of the
perpendicular. Perceiving this settlement as a severe
threat to the existence of the tower, Bonnano tried
to remedy the situation immediately by moving the
center of gravity inside the tower, therefore placing
the first, second, and third stories nearer the ver-
tical position. As subsidence continued, the project
was abandoned. Sixty years later Benenato, respon-
sible for maintenance of the cathedral group, and
having taken an oath not to neglect work in progress,
renewed work on the tower which, having in the mean-
time sunk further, was now even more difficult to
correct. He managed to add a fourth story. Soon
afterwards, William of Innsbruck restored the struc-
ture to a seemingly upright position by simply
making the pillars of the fifth and sixth stories
longer on one side than the other. But as the founda-
tion continued to sink, he found the situation intrac-
table and abandoned the project. After a lapse of
approximately one hundred years, Tommaso Pisano, son
and pupil of Andrea Pisano, undertook the unfortunate

enterprise, erecting a bell tower at its summit,
again drawing the entire structure slightly closer
to a vertical position. If the tower had progressed
a few feet higher at this point, the center of
gravity would have moved to the outside, causing the
structure to collapse. The campanile, now actually
curved in shape due to its progressive deviation
toward an upright position, leaned thirteen feet to
the south and had dropped approximately seven feet
below its original grade level. By 1839, the lean had
increased to fifteen feet and at the middle of the
twentieth century to more than seventeen feet.
After an unsuccessful attempt to stop settlement by
cement injections in the foundation, in 1964 local
authorities considered a plan by an English consultant
J. Pryke that involved reinforcing the foundations,
settling the tower on new foundations by means of
internal supports, and finally jacking up the base
of the tower to decrease the lean by approximately
eighteen inches.

The tower stands 184 feet 6 inches high, has a dia-
meter of 51 feet 8 inches, and is constructed with
white marble on the exterior and stone on the
interior. The massive basement story is faced with
half-columns with varied capitals supporting semi-
circular arches. Above this level are six arcades
supported by slender columns differentiated slightly
in technique and decorative effect at each zone, an
example of over-ornateness at its zenith, visually
fatiguing in its multiplicity of detail. The eighth,
or summit story, containing the bells is reached
by 296 slowly rising steps. The seven bells were
placed in the tower with the intent of utilizing

49
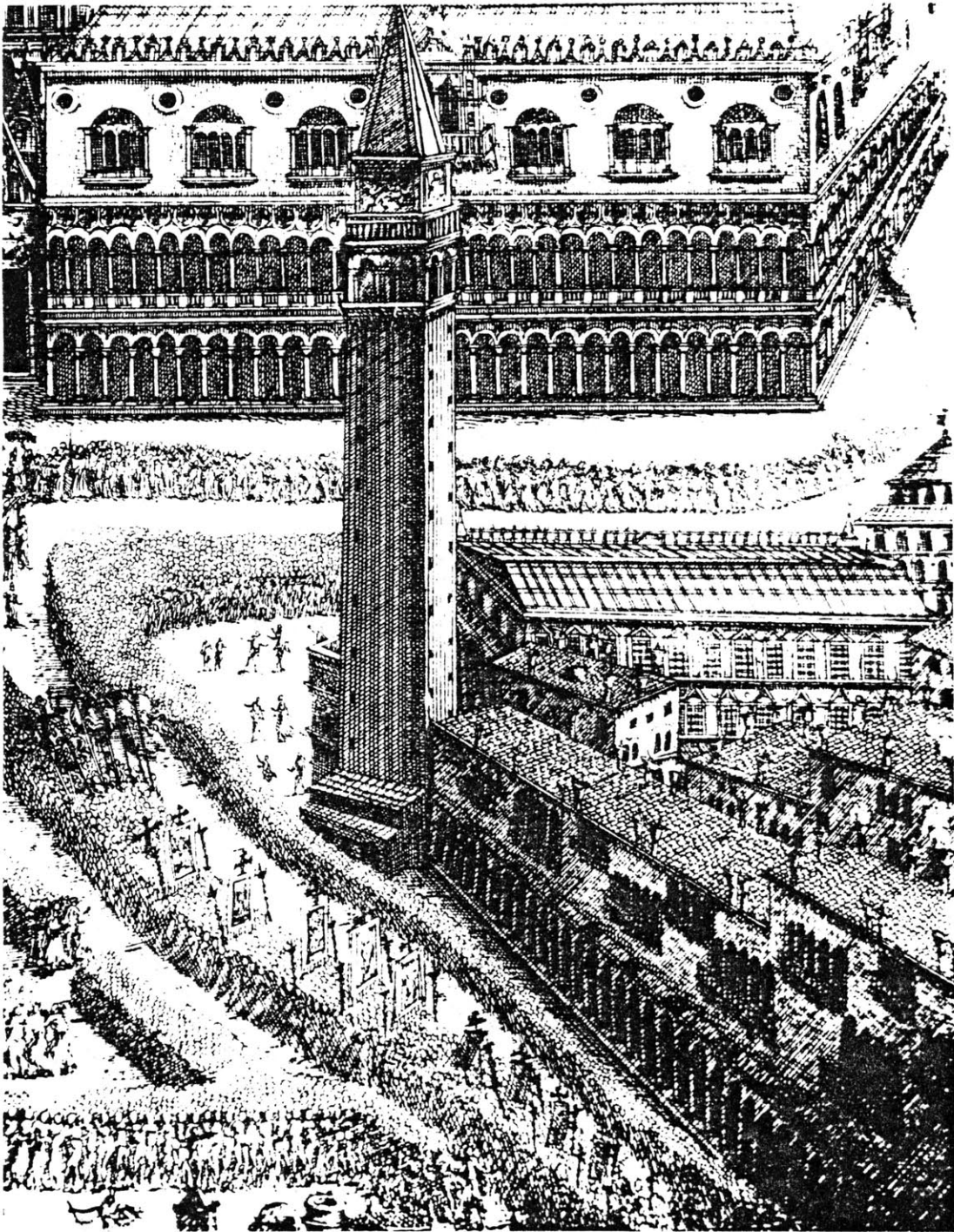
their weight to counteract the inclination; the heavier ones were hung on the higher side. The largest bell, cast in 1655 by Giovanni Pietro Orlandi, and called L'Assunta in reference to the dedication of the church to the Virgin of the Assumption, weighs 3 1/2 tons and is inscribed with an image of the Virgin and the arms of the Medici. The oldest bell, called Giustizia after its original location in the Torre del Giudice where it proclaimed the death of criminals and traitors, dates back to 1262. The remaining bells possess similar individual histories and identifying characteristics. [2]

The origins of the cylindrically shaped tower are attributed to Byzantine influences such as those expressed at an early date in Ravenna in S. Apollinaire in classe. Other examples of the cylindrical type appeared in Ireland, where their early development and use was rapidly widespread, and in various locations in Belgium, Switzerland, and Germany. The detached square belfry eventually became more popular than the round belfry; often decorated with pilaster strips and corbel tables, it has also been attributed to Byzantine influences. One of the earliest examples of this type was the plain Monk's Tower constructed in the eleventh century near S. Ambrogio in Milan. [3] Perhaps the most conspicuous quadratic belfry, possessing a relatively mature design considering its early date is the Lombard tower at Pomposa, built in 1063. A classical example of this type appears in St. Mark's in Venice; here the surface of the shaft is articulated with lesene culminating in arches and capped with a broadly fenestrated belfry section and steep pyramidal roof. [4]

18. Venice. St. Mark's campanile, A Procession in the Piazza, by Giacomo Franco, 1571

51

Rarely adopting the scheme of the twin-towered west facade,the simple basilical facade aligned with the cross section of the nave remained characteristic of Lombardy where cylindrical or quadratic towers were by preference isolated and set alongside the church. Belfries multiplied in the eleventh century because of improvements in bell casting and increased means for production available. It was now possible for almost any church to have its own set of bells, once a tower was constructed for their housing and display. As the cylindrical belfry became more an exception than the rule, the quadratic belfry was to spread rapidly through Lombardy acquiring virtual universality through its continuing use in Romanesque architecture. [5]

It is not for artistic merit that the campanile at Pisa has become so widely known as John Ruskin so aptly suggested:

> It will be remembered that I said the tower of
> Pisa was the only ugly tower in Italy, because
> its tiers were equal, or nearly so, in height;
> a fault this, so contrary to the spirit of the
> builders of the time, that it can be considered
> only as an unlucky caprice. [6]

More powerful than any inherent beauty it may possess is its anomalous image as a tower resulting from its lean. Until recently, some observers believed that the inclination was intended by builders to show their skills or their "unconventional and possibly refractory disposition." [7] Early writers elaborated on how or why this was done, though many of them had never seen the tower, nor the type of soil on which it was built. John Evelyn, who had visited Pisa

in 1644, also falls into this error:

> It stands alone, strangely remarkable for
> this, that the beholder would expect it to
> fall, being built exceedingly daringly, by
> a rare address of the architect; that and
> how it is supported from falling I think
> would puzzle a good geometrician." [8]

A majority of early travellers agree with him and proceed to advance more outlandish theories. A learned Frenchman of the eighteenth century, for instance, explained that the architect was actually a hunchback and deliberately built the tower in distorted configuration to resemble his frame. It was also repeatedly declared that the inclination was symbolic of the declining condition of the Republic whose glorious days were over. An incidental but fortuitous result of the defective stance of the tower was its role as a successful component in the apparatus of Galieo during his experiments with gravitation. An obviously advantageous outcome of the lean is the currently thriving Pisan tourist trade.

The Romanesque churches ranked only after the Gothic cathedrals in size and therefore in their involvement in civic pride, and the largest Romanesque church in Tuscanny is the cathedral at Pisa. For a century after the Pisans defeated the Saracens in a sea battle off Palermo in 1063, their port city was a leading power in the western Mediterranean. The cathedral group, begun promptly after this victory, attests to its perceived greatness at the time. The careful attention given to the situation of its

individual components in a spacious greensward

deliberately kept clear over the centuries of the
surrounding settlement pattern reinforces its sym-
bolic consequence. [9] Therefore, the role of the
campanile in the competition of Pisa with surroun-
ding city states, particularly Venice, and its
purpose as a landmark, not merely a representation
of itself but also a form of publicity for commer-
cially prosperous Pisa, was probably of greater
importance at the time than the more utilitarian
functions of the typical Romanesque tower as a
campanile, defense tower and watchtower. Though
initiated under the reign of a Countess who sup-
ported the papacy for one of the most substantial
cathedrals of the time, its religious consequence
has been further undermined by the mythical
phenomenon that has been inextricably associated
with it since the commencement of its construction;
any architectural merit it may possess is of insig-
nificant importance in comparison to its unrivalled
leaning image. This image soon became the most
spectacular "advertising for the town."

CITY FORTRESSES

Weakening authority and discontinuity in political
institutions in the early middle ages was indicated by
the political power vested in the bishop. As the
decaying Carolingian dynasty was transformed into an
era of feudal particularism, bishops acquired their
position through royal designation or simply exercised
their rights de facto in absence of any other strong
local authority. [1]

The process that transformed the sparsely populated
northern and central Italy into the citified Italy of
the Renaissance began as early as the tenth century,
but the period of sharpest change occurred during the
eleventh and twelfth centuries: the population had
doubled between the tenth and fourteenth centuries, the
citizenry of towns increasing in an infinitely greater
proportion, and a widespread movement from the country-
side to the town began. The feudal system of land
ownership and legal privilege that preceeded the growth
of medieval towns tenaciously outlived their gradual
evolution and decline, eventually dying in the age of
Napoleon. Because the nobility continued to own land,
the bourgeois were forced to live with their power;
the interests of these two groups were continually
in conflict, even though it was not always openly
expressed. The feudal magnates, neither artisans or
merchants, were subject to different laws than the
bourgeois, so their value to the city was considered
marginal. Although the parties settled down to a

19. Pavia, towers

57

somewhat mutually beneficial urban coexistence, the fundamental contradictions were deep and ubiquitous.[2] This far reaching horizontal social fracture was defined by Machievelli:

> "The cause of all ills that arise in cities is the serious and natural emnity which exists between nobles and poplani, caused by the desire of the former to command and of the latter not to have to obey them." [3]

The commune was formed in response to the need by the town, despite existing social differences, for a permanent executive body representing citizens. Through recognition by the western emperor, it replaced the prevailing episcopal authority as the most important jurisdictional power within the city. With the new form of government came new military, diplomatic and administrative institutions that conferred upon the city an awareness of its distinction and individuality. The commune came to signify the citizens as a collectivity or their legislative assembly. But the land-owning nobility established a political independence and form of control that enabled them to set the tone of politics. In some instances three or four families gained by agreement a shared constitutional domination occasionally resulting in joint control of the commune's offices. These formal alliances were known as consortiums. The consortium was essentially an agreement for mutual assistance among nobles. Its most typical purpose was to provide for the erection of a tower. [4] An oath by the members of a consortium founded in Bologna in 1196 illustrates the nature of this organization:
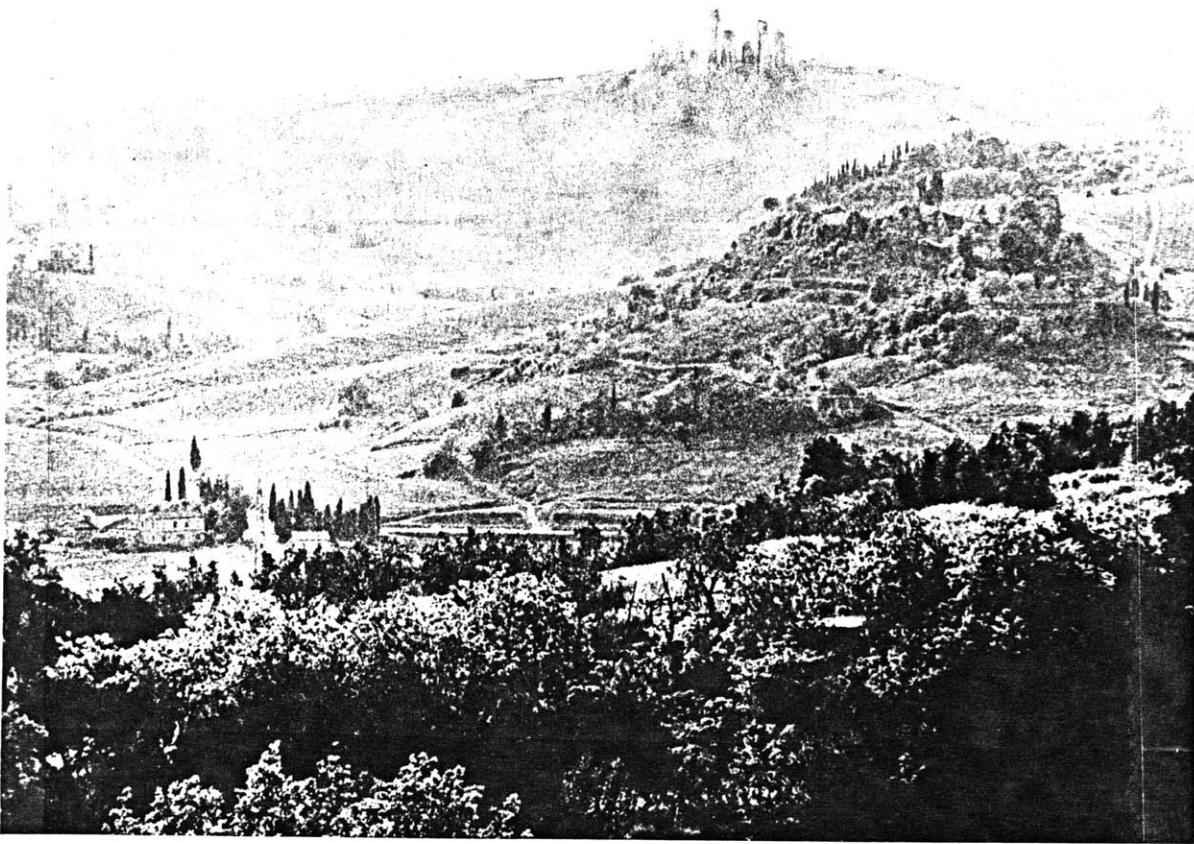
20. San Gimignano,
    distant view

We swear to help each other without fraud and
in good faith... with our tower and common
house and swear that none of us will act against
the others directly or through a third party.
If this tower should become necessary to any of
the jurors for his own purposes... the others
are to make the tower and house available to him
and to help and not oppose him. Matters concer-
ning the construction of the tower are to be
settled by the decision of two men chosen from
the jurors and they are to decide in good faith
what is in the best interest of the kin who
swear this oath. [5]

The quasi-military domestic tower represented the

citified adaption of the countryside keep. The keep,

or stronghold, stood isolated as a form of military

tower, but more characteristic was the incorporation

of the tower in castle or city walls. In many cases

the keep was later ringed with concentric curtain

21. Reconstruction of
    medieval stone
    burg: circumam-
    bient wall and
    tower
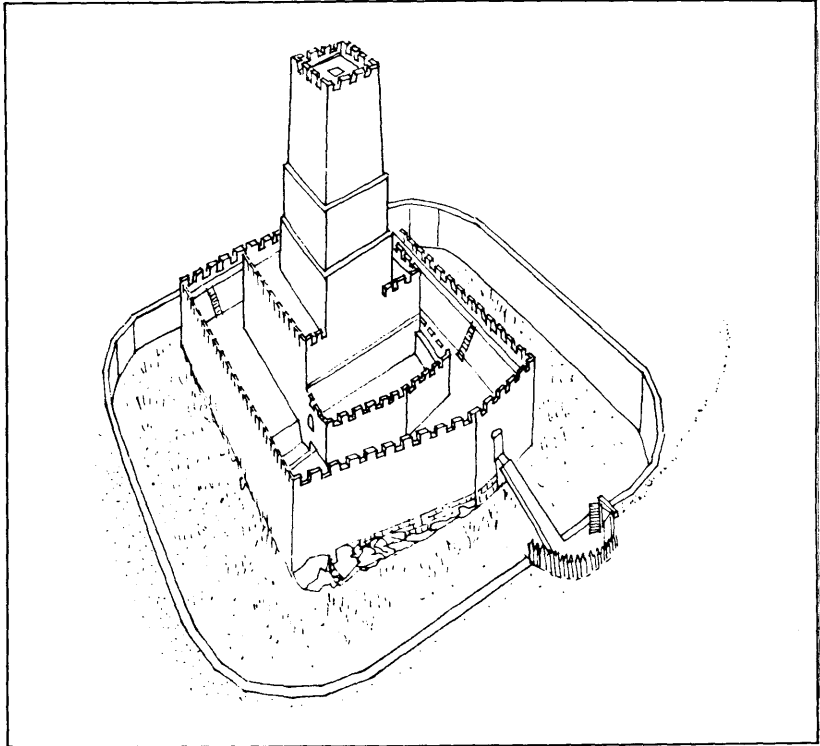
walls and commonly studded with towers that were used
as strong points in defensive strategy or in some
cases for observation or active defense. Typically
Italian castles had high walls topped by elaborate
machicolations and stiffened by rectangular or
square towers. [6] City walls, a great source of civic
pride, were evenly articulated along their length with
low towers that presented a closed massive face to
the outside, but opened with fenestration towards
the town. City gates were occasionally used as
watchtowers. Bearing arms or emblems and designed
with careful attention to detail, they presented the
facade of the town to arriving visitors. [7]

The creation of the city fortress was made necessary
by an institution that was itself familiar in outlying
areas, the vendetta or blood feud, a traditional
violent method for settling or prolonging private
disputes resulting from an unwillingness to settle in
the courts. In the city it primarily functioned

defensively as a place of retreat under prolonged
sieges. It also became conventional for those who
were financially able to do so to build a house with
a tower or to acquire one by inheritance from ances-
tors. For this reason the city tower was probably
built also because it was considered an acceptable
form of house architecture rather than for the sole
purpose of carrying out vendettas.[8] Though it has
been suggested that tower building may have been
motivated by economic considerations and though this
may be correct to a certain extent, it is probably
generally not the case as many cities had available
building space near locations where towers were
constructed. The towers were often square and una-
dorned because of the speed at which they were
constructed and the limited availability of appropr-
iate methods and materials. When in some districts
towers were closely packed, encouraging fighting as
a result, it may have been advantageous to build
higher than one's neighbor, but in this case the more
typical motive for building high was probably osten-
tation.[9]

As it expanded and settlement grew dense, the skyline
also changed radically, transforming eleventh century
Rome into Roma _turrita_. Until the beginning of the
fifteenth century, hundreds of towers were built by
the town-based nobility in addition to the extensive
number of campanili that soared skyward. However,
unlike similar skylines in other Italian towns, the
towers were overpowered by ruins and buildings of
antiquity. Though there were instances of the wide-
spread destruction of family towers, for example when
a short-lived republican commune tore down all of
those supporting the papacy, the towers were always

quickly rebuilt in addition to new and stronger ones
built from scratch. Sites of ancient mansions were
fortified with towers by noble families: on the Forum,
around the Colosseum, on the slope of the Quirinal,
on the Esquiline, and around the Palatine. They
dominated the streets and linked the core of the town
to the suburbs and to the family seats in the country.

Towers were used by the families to designate an area
of the city under their domination. The Frangipani
along with the Pierleoni, the most powerful family
around 1100, built mansions all over the Forum, at
the Palatine and at the Colosseum creating a neighbor-
hood known as Campo Torrechiato. Additionally they
acquired the north slope of the Palatine where access
was defended by a tower built against the Arch of
Titus known as the turris cartularia. The Frangipani
continued to acquire towers in critical locations,
for example at the end of Circus Maximus, on the Esqua-
line and along the roads to the Lateran from the west
or the north where they were in a position to defend
or besiege the popes, depending upon the political
circumstances at the time. As the family lost power
in the thirteenth and fourteenth centuries, the
towers and fortifications went to younger families
such as the Annibaldi: as early as the beginning of
the thirteenth century they owned or had built towers
all over the same neighborhood and at the Lateran had
placed a tower on top of an aquaduct that visually
dominated the approach to the papal palace. Pope
Innocent III commanded that it be removed. [10]

The towers filled a dominant, decisive role in ven-
dettas and in fights between papal and anti-papal
factions. In 1203 a tower-war occurred where the

62

Capocci class, acting as initiators and villains
rebuilt a tower against the command of a chief sena-
tore and attacked the official's tower with

> "wooden siege-towers, walls and moats,
> fortifying thermae and churches round about,
> and setting siege machines atop an ancient
> monument'." [11]

The ancient monument may have been the market of
Trojan. As defense against the offensive Capocci
five towers were built by several families near the
Colosseum. Restricted to a small area, fighting was
more that of street gangs rather than real war, rein-
forcing the possibility that the tower functioned as
a status symbol as much as it did as a defense struc-
ture.

In Pisa, most houses were towers, vying with each
other for height, packed closely together on either
side of narrow darkened streets. They were sometimes
connected with wooden bridges and furnished with
wooden balconies that were very effective in warfare
with neighboring towers. During tower-wars light
bridges with grappling irons were thrown from tower
to tower, doors and windows were barricaded,
mangonels sent masses of stone through the sky and
boiling oil or lead was poured on the heads of those
who ventured down to attack doors. Although advan-
tages of height may be attributable to these type of
combative situations, to the difficulty of expanding
laterally within city walls, or to ostentation, in
Pisa it was claimed that the chief advantage was
gained when the nobles gloried in adding tower on
top of tower to look down on all of their rivals. [12]

The great height of the towers, sometimes reaching 200 feet, caused them to be regarded as a menace to public safety. After exposure to lightening or wind in a storm, some towers would inevitably collapse, pulling down adjacent balconies and bridges in their fall. Though fire often broke out and the commune ordered all wooden structures such as balconies to be destroyed, the attempt to minimize this kind of danger seems to have been largely disobeyed. In a gale in 1325 several towers fell, burying fifty people in their ruins. Ten years later, the Torre di Ferro was split into three pieces by a storm and stones fell, killing people nearby. Not menaces in every instance, one advantage of the towers was that they served as refuges from the frequent conflagrations that desolated wood-built portions of cities.

The Pisan towers were generally built of stone and sometimes brick. The lower walls were strengthened by a vast masonry ogival arch filled with stone or brick and the different stories were supported by arched vaults. Ladders were used to climb between floors. In the masonry there were brackets with square sockets located above them into which beams were inserted to support projecting wooden balconies. Seven to eight feet higher there were corbels for attaching a roof to the balcony. The majority of the towers were crenellated and machicolated.

In 1175 it was forbidden for reasons claimed to be in the public interest to build a tower of greater height than 57 feet and two sworn officials called "captains of the wall" were appointed to enforce the law. At a later time, a height of 95 feet was

allowed. There were also laws enacted to control

projectiles: it was forbidden to throw anything from a bridge or balcony at another person or another tower. Repressive measures were enacted against the bridges connecting tower to tower because their vast network was a menace and they deprived the street of light and air. Structures violating the new legislation had their height diminished by one half and a heavy fine imposed. Materials from dismantled towers became the property of the commune and were transferred to an arsenal from which the wood was taken for building galleys and the stone and brick for building docks.

In 1286, the commune stopped all tower building in one quarter of the town because fighting was generated as an outcome of density of vertical construction. Again officials were appointed to investigate the condition of the towers and were granted power to destroy dangerous, weak or defective ones. Occasionally the commune erected towers for itself with the intent of surveying the activities of the nobles, in some cases having to resort to the use of weaponry. During the extended struggles that finally ended with the subjugation of Pisa to Florence, an inordinate number of towers were destroyed, but the skyline was most severely affected in 1509, when Florentine conquerors demanded that all surviving towers be reduced to a height of no more than 52 feet.[13]

In Bologna all the towers were erected in the most spatially restricted area of town. The distance between the two most well-known surviving towers, the Garisenda and the Asinella is about thirty-six feet, a greater spread than the spacing of the original closely packed tower groups. It was

65

22. Bologna, Garisenda
    and Asinella
    towers
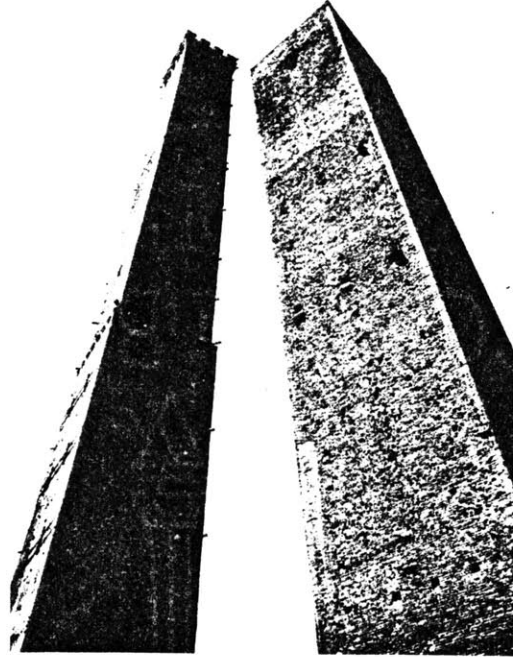
believed that the height varied according to the
ambition and wealth of the owner. [14]

The Asinella tower is one of Bologna's most distinc-
tive monuments. Erected at the end of the twelfth
century, it suffered damage by lightening, was
repaired and later left unscathed by an earthquake
in 1505 that leveled many other local towers to the
ground. It is 332 feet high and leans four feet.

The Garisenda tower was built at the same time as the
Asinella. Truncated and as clumsy as the Asinella is
graceful, it nevertheless holds the same rank due to
the interest it has generated over time. Dante, a
student in Bologna from 1304 to 1306 provided it with
an importance its companion tower would never achieve;
he used it as an image simply because it leans:

    ... As appears
    The tower of Garisenda from beneath
    Where it doth lean, if chance a passing cloud
    so sail across, that opposite it hangs. [15]

Its present height is 158 feet, although it was 200 feet high at the time of Dante, prior to the dismantling of its top in the fourteenth century. It leans more than the Asinella, about ten feet, and the lean is more obvious because the tower is shorter. The inclination is explained by some as subsidence of soil, but Goethe believed it was an intentional deviation on the part of the builders:

> I fully explain this folly to myself as follows - In time of civic tumults every great building was a fortress for which every powerful family raised a tower. Gradually this tower building became an affair of honor and of pleasure. Everyone wished to boast of a tower, and when finally the upright towers became too commonplace the leaning ones were built. And both architect and owner reached their aim. We overlook the multitudes of upright towers and seek out leaning ones. [16]

In Florence religious campanili were highly developed, but private towers, of which 150 have been reported, were more numerous. Even in peaceful times, at best they gave the city a "heavy air of truce".[17] Closed, bare crenelated shafts with removable balconies set on corbeling, their gray masses loomed over the streets. Thirteenth century Florentine consortiums were commonly associated with the Guelph or Ghibelline factions, representing papal and imperial polarization respectively. As soci torri, or tower societies, they had gained tremendous political and social influence and struggled for power and defense of their honor; their principle strategy was retreat into their towers, continuing warfare as they watched the enemy struggle on the street. On one occasion approximately 500 Guelph towers suffered extensive damage during a brief interlude of Ghibelline rule.[18]

23. San Gimignano

San Gimignano has thirteen tall towers remaining out
of approximately an original 75 which were erected
from the twelfth century onwards. Like other towered
cities up and down the Italian peninsula it had
become a quarreling community where families were
constantly at war with one another, in this instance
especially those associated with the Guelf and
Ghibeline factions. There were also the usual
struggles between the magnates and the poplani: the
Captain of the People gained the power and position
frequently held by the Podesta and limited the special
council over which he presided to poplani. Guards
were continually kept at both the Tower of the
Podesta and the Tower of the People, chains were made
for streets and gates and special custodians were
appointed for each precinct of the town. But as the
struggles became more embittered, the days of the
republic were numbered. The Florentines were beginning
to treat San Gimignano as a vassal state, and in the

68

spring of 1349 the commune of San Gimignano was compelled to surrender the custody and government of the state to the Florentines. After 1353 the Florentine Podesta resided in the Palazzo Comunale: its tower, the Torre del Comune was slightly higher than the Tower at the old Palazzo del Podesta which after 1407 marked the limit to which noble citizens were allowed to built their private towers. [19]

Rivalous and active political life was characteristic of the towns of medieval northern and central Italy. In addition to continuous conflict between jurisdictions, local factions and individuals displayed an ongoing struggle: the nobility had brought their castles and keeps to the city and along with them their unruly, violent former way of life. Bloody struggles between the bourgeoise and the land-owning nobility continued and the nobility battled among themselves as clan was pitted against clan. The towers were the chief mechanism for the manifestation of these struggles. As heavy closed fortresses they were ideal watchtowers or defensive structures: their narrow domineering heights and random window voids were well suited to observation of the enemy, active warfare, or protection in retreat. Stylistically they were remarkably similar to the countryside fortress: commonly understood associations of heavy walls, punched windows, machicolation and corbelling, and wooden balconies were employed by the magnates as elements of verification of their power: the tower was a status symbol. The motive for tower building was tied to earlier associations pertaining to the value of land: active defense and the use of towers as markers to stake out urban territory or as lines of defense was a natural inclination for those familiar

69

with the importance of territorial claims and the inevitable accompanying defensive activities to the country fortress. The hasty, often insubstantial construction of towers and their dense configuration as a group was expressive of the intense competition generated by the motive of building for display; such careless vigour was reflected in futile efforts to achieve building control through enactment of statues incorporating issues of light, air and public safety. The high jagged skyline was not only an expression of competition beteween individuals, but also between groups; in Rome, authorization by the dominating authority of one particular group over another meant lowering the towers of the disfavored group, signifying defeat. In San Gimignano when the _poplani_ sought to counterbalance the social weight of the wealthy and lawless with the election of a Popolo, a tower was built to legitimize the authority of the newly appointed political figure. Likewise, when placed under the

the custody of a rival state, the realization of new authority was reflected by lowering the agglomeration of individual towers to emphasize the tower signifying a new government, to declare political domination on the skyline. Generally, the initial period of self-government by the commune and the recourse to violence as a means of settling differences meant the life of the commune was precarious. The inevitable result was the establishment of a strong local political office, or _signoria_, or the relinquishment of local government to another state. In both cases private towers were lowered in acknowledgement of the tower representing the municipality. Never had the vicissitudes of politics been so ardently manifested on the skyline.

70

FLORENCE: PALAZZO VECCHIO

The city-republic contributed greatly to the outlook
and growth of its citizens. Through the milieu
provided by an active, though contentious, political
life they could not help but feel committed to its
well-being: the spirit of _campanilismo_, of the
cherished city tower, was alive in citizens who
fought with patriotic commitment alongside their
neighbors against offending towns. Pride in the
city's appearance and the competitive determination
to distinguish oneself from neighboring cities were
traits common to the city states of northern Italy.[1]
Man's vanity and his dependence on audience, be it
admiring or envious was represented in the use of
Gothic architecture for secular purposes in town
halls, private palaces and houses. [2] The ambitious
cathedral of Siena was a reaction to the cathedral
begun by Florentines in 1296. Their Palazzo Publicco
was under construction at the same time: it was an
attempt to show that Sienna could build more impres-
sively than its northern neighbor. The result was
perhaps worth the approximately fifty years it took
to complete: it eclipsed the fame of town palaces
built earlier in other communes, with the exception
perhaps of the Florentine Palazzo Vecchio. [3]

Unlike the abstract conception of government so
familiar today, the Florentine state was almost
religious in its pervasiveness, denseness and

24. Florence, Palazzo
Vecchio, facade

73

influence. When its citizens began construction on the Bargello in 1250, their first monumental seat of government, a fortified residence for the podesta and his retinue, a new architectural expression was found in the synthesis of the communal defense tower with a belfry. Here the Florentines had broken the inhibiting mold of Gothic religious expression to initiate some creative developments in civic architecture, starting with the Bargello and continuing in a more comprehensive sense with the Palazzo Vecchio, built after a half century of internecine conflict between the Guelfs and Ghibellines over the nature of the town constitution. The cornerstone for the Palazzo Vecchio was laid in 1299 and the bells were placed in the highest tower in Florence in 1323. Like the Bargello it drew on three traditions of tower building: the closed monumental bulk of the structure resembled a fortress with its powerful battlements and removable balconies and stairs, the ornate windows were adapted from ecclesiastical architecture, and the belfry could be directly attributed to religious influences. Braunfels believed the structure embodied the most essential aspects of the city: the crenelated body resembled the city wall, the tower at its edge was the civic watchtower, and the white marble columns at the top were representations of might and pride borrowed from the imperial _rocca_ of Frederick II.[4]

According to Trachtenberg, the symbolism is more complex and actually embodies momentous developments in traditional examples. The military battlement top has been domesticated by the insertion of a windowed story between the corbelling and the crenelations

suggested by the upper story of private residences:
what was once harsh militarism now has a sense of play.
The openings help to harmonize the crown with the wall
below where ecclesiastical windows punched in the
massiveness of the facade have much the same effect.
Beneath the tower a heavy shaft not visible from the
facade was incorporated in the body of the Palazzo;
more than simply hidden by the elevation its existence
has become ambiguous with the insertion of windows in
the facade that provide the illusion of continuity
masking and denying the existence of the support. But
the daring masking of structural reality does not
stop with this gesture: the tower base has been thrust
forward so that it aligns itself with the crenellated
portion of the facade and rests there as if by negli-
gence on the part of the builders. It appears that
the hollow crown could hardly support a load of such
magnitude, so the tower leaps skyward, initiating a
dynamic tension between the reality of the mass and
the deceit of weightlessness.[5] For Ruskin, the con-
figuration possesses anthropormorphic qualities:

> Whether, therefore, we have to do with
> tower or wall... I am much inclined
> myself, to love the true vertical, or
> the vertical with a solemn frown of
> projection (not a scowl), as in the
> Palazzo Vecchio of Florence... for the
> sense of threatening conveyed by this
> form is a nobler character than that of
> mere size. And, in buildings, this
> threatening should be somewhat carried
> down into their mass. A mere projecting
> shelf is not enough, the whole wall must,
> Jupiter like, nod as well as frown. [6]

The dynamism of the tower base is echoed in the
combined expression of corbelling, crenellation and

75

fenestration in the watch-box that tops the tower
shaft. Simple corbels and arches have been trans-
formed into elongated spikes. The stringcourse,
rather than functioning as a separation is brought
down heavily to bear on the pointed arcade. Deep
recesses in the solid mass are contradicted with
delicate white columns. The crenellations on the
watch-box, unlike those below, have become jagged and
tooth-like. While the shaft presents a soaring
dematerialization that conflicts with the downward
weight of its assumed massiveness, the crown writhes
with an unrelieved tension resulting from the form
and placement of its component elements. The balda-
chino that rests on top of the watch-box delivers a
sacred connotation to the bells of the Signora, a
contradiction that refuses to be resolved by the
arched corbeling that encircles the superstructure
and attempts to shed ecclesiastical associations in
its relationship to the crenellations below. [7]

For the commune at Florence, full of civic pride in
the 1330's, it seemed only appropriate to build a bold
vertical expression, but the driving force beyond a
decision of such magnitude had to run deeper. The
Palazzo Vecchio was constructed at an unprecedented
speed; it had even interrupted construction on the
cathedral project. Why did the young vulnerable
government so desperately need the dignified security
of a monumental edifice? In the tower-wars of the
magnates, the first sign of victory was destruction
of the opponent's tower or keep, ruining the base of
power and in the process deprecating pride. Utilizing
the advantage of a traditional approach to serve new
conditions, the first act of the Popolo when coming
into power was to decree a leveling of all private
towers to a limited height. However, such widespread

attempts at demolition did not suffice. The consortia
with their towered urban castles and rural strongholds
were adamantly resistent, a threat to the young rep-
ublic. One of the first deeds of the priorate after
completion of the Palazzo Vecchio was to legislate a
statute calling for the dismantling of private towers
to one third of its height. Other statues prohibited
the use of war machinery on the "resulting stumps",
indicating that if such a violation did occur, the
tower of the offender would be razed to its founda-
tions and the individual responsible for the offen-
ding action would have both hands amputated.

But despite stiff regulations the lawlessness of the
nobility continued. In the 1330's several magnates
were convicted of serious offenses of communal laws
including arson, murder, devastation of church property,
attacks on communal fortifications, highway robbery and
treason. None of the sentences were executed because
for a minor fine a magnate could have the most serious
condemnation annulled. Considering this example, it
is not surprising that towers remained armed and
continued to stand at their previous illegal heights.
Towards tne middle of the fourteenth century a puri-
tanical government came into power, laws were more
strictly enforced and the commune permitted many of the
magnates to become citizens, encouraging their power as
a group to fracture, channeling it instead into the
common good. It was at this time that the statute
decreeing the dismantling of the family towers
seems to have taken effect. As the towers were
lowered and disarmed, the city erected a number of
large scale campanili in addition to the Bargello and
the Palazzo Vecchio. The change in the cityscape over
the course of a century was remarkable. Earlier the

streets of Florence were deep shadowy canyons of
violence winding through the individual domains of
private keeps. When the looming fortresses were
reduced in size the citizenry of Florence became
newly aware of the prominent church and civil bell
towers collectively built. [8]

Although the focus of the typical medieval town was
the worship of God, according to Mumford the town
hall was built not only as an expression of politi-
cal power and civic pride but also to fill the
critical dual role of a "collective palace for the
patriciate" and a symbol for the merchant guild as
well as its meeting place. [9] For Trachtenberg, the
control asserted on the skyline of Florence through
the tower of the Palazzo by the governing bodies of
the time, essentially extensions of the logic of
the consortiums, was limited in access and represen-
tation. [10] The power of these groups was legitimi-
zed through an almost frightening architectural
expression in the combination of countryside fortress
with a church belfry "humanized" with ecclesiastical
and palatial embellishments, details that only rein-
forced contradictions arising from the simultaneous
use of stylistic sources with dispate associa-
tions. Despite such contradictions, the image of
brute strength was overpowering. The role of the
Palazzo Vecchio as a symbol of a limited access
group was reinforced later when the Medici family
concentrated all the matters of Florentine banking
in their hands and issued a proclaimation that all
towers owned by individuals should remain lower than
the Palazzo Vecchio, the headquarters of a govern-
ment that was in actuality inextricable from the
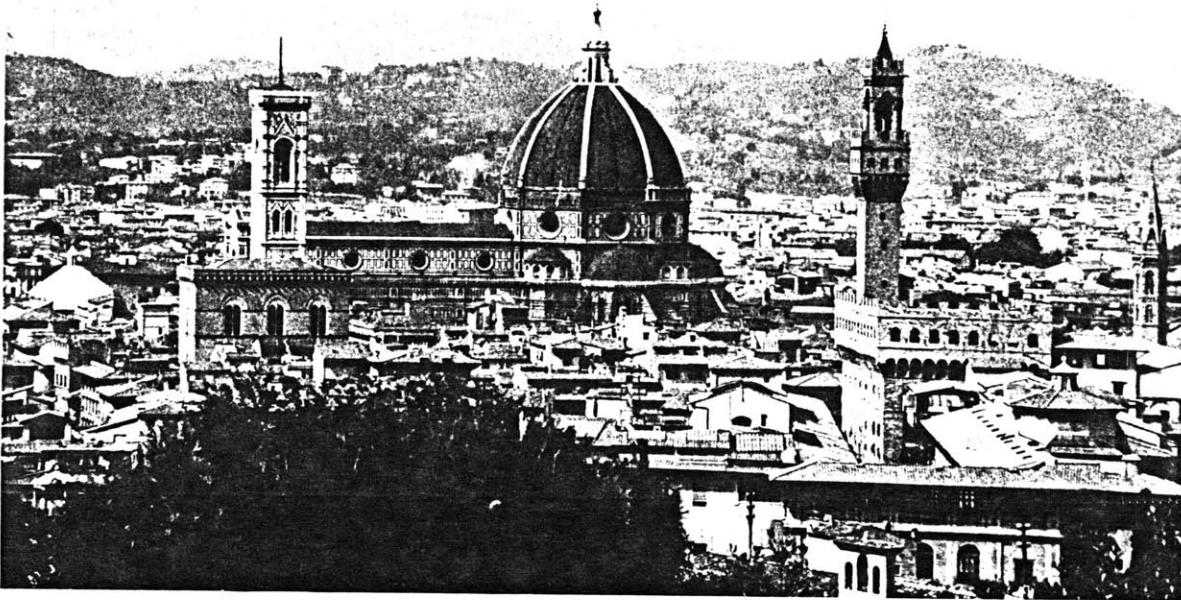
25. Florence, view of
the campanile of
the cathedral and
the tower of
Palazzo Vecchio

Medici. The Palazzo tower had failed to fulfill the
instinctive need in all Florentines for a tower of
their own or at least membership in a "tower group".
Trachtenberg claims energetic construction on the
tower of the Florence Cathedral was pursued immedia-
tely after the completion of the Palazzo Vecchio in
an effort to meet this need. [11] Though lower in
height, its use of variegated marble and elaborate
detail led it to command as much attention on the sky-
line as the tower of Palazzo Vecchio. Neighboring
Siena displayed an ostensibly similar skyline situa-
tion, however additional underlying motivations were
involved. It was claimed that its Palazzo tower,
obviously influenced by the Palazzo Vecchio, had to
be particularly imposing so that it would dominate
the Cathedral. But later drawings indicated that the
visionary Sienese cathedral project, the Duomo Nuovo,
would have been accompanied by a new campanile just
as high as the tower of the Palazzo. Such a pheno-
menon can be partially explained by the desires of

particular groups to outvie one another with tower
construction, but such aspirations were increasingly
recurring at the time: Giantism had become a progres-
sive, widespread phenomenon. Not only did campaniles
and Palazzo towers grow, but also Gothic cathedral
naves, as indicated in the progression from Laon to
Chartes to Beauvais, and towers, as indicated at Stras-
bourg. [12] The cult became competitive more often
between towns than within towns; most towns acquired
a civic symbol in one large tower. Even in situations
where a singular tower image was not apparent, as in
Florence, in the greater context towers shed associ-
ations with specific local groups and encouraged the
spirit of campanilismo through a distinctive manifes-
tation of the meaning of the city as a whole.

Specula publica
vulgo de Halle

Brugensis
Torre.

1. Halla aquatica vulg. Waterhalle.
2. Fons publicus.
3. Palæstra pugilum.
4. Breydelstrate.
5. Wollestrate.
6. Turris publica.
7. Hospita ad Hallam.
8. Stroostrate.
9. S. Amandestrate.
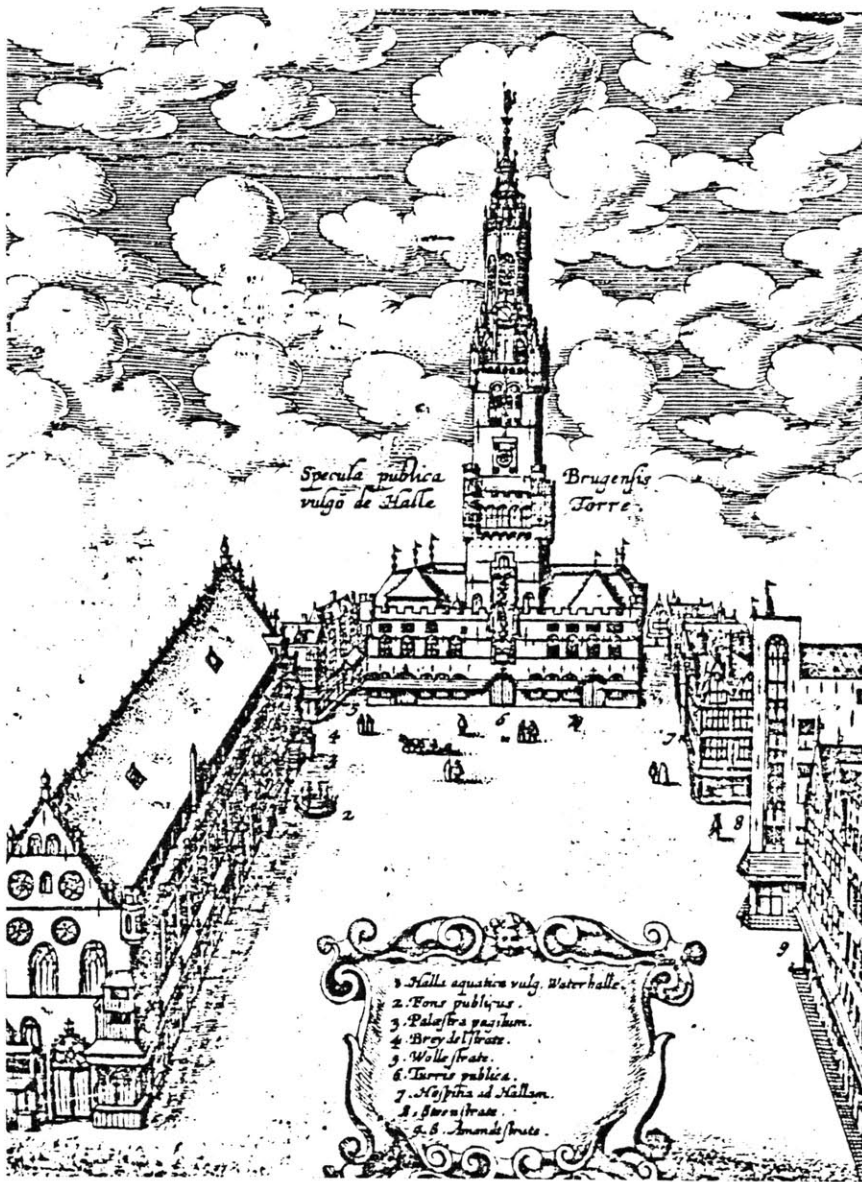
BRUGES: THE BELFRY

The growth of the commercial city was a long process because it was met with resistence by both the structure and the customs of the early medieval town. Change was slowly brought about by a new kind of commerce that developed outside the domain of individual guild regulations, and with the growth of long-distance trade a new urban civilization gradually emerged. Flanders represented that portion of Europe where the connection between urbanism and trade found its highest expression. [1]

The relationship between the Flemish state, represented by the Count of Flanders and his officials, and the Flemish towns was exceptional for its time. Independence from France combined with the eminence of the Flemish counts, brought what had previously been a French feudal country to a height of political maturity that existed nowhere else in Europe in the early twelfth century. If the county of Flanders had been oriented towards agriculture, such prominence might not have been achieved. Its disproportionately great political fortitude was due chiefly to the intensity of its urban commerce, a result of long-distance trade. One of the most powerful communal cities of Flanders, Bruges, along with Ghent, Ypres, Arras, Douai, Lille, and other small towns in the immediate vicinity, created the first center of a textile industry that supplied the world market of the time, exercising a

26. Bruges, view of the Grand Place about 1640 showing the completed belfry

83

powerful influence over the fortunes of Western Europe.[2]

The commercial achievements of the Flemish towns were
rivaled only by the towns of Northern Italy. In
their specialized field of cloth production they were
unequalled, denoted by the fact that Flemish cloth
was a key item of trade in the distant Orient and that
the similarily developed Florentine cloth trade attem-
pted to duplicate the cloth of such Flemish towns as
Ypres, Douai and Arras. The volume of cloth production
achieved a significant level in the thirteenth century
and increased further at the beginning of the fourteenth.
The position of monopoly enjoyed by the Flemish cloth
industry was reinforced when Bruges became the contin-
ental trading center for wool around 1300. By 1293,
the brokers or "factors" of Bruges had established
their claim to act as intermediaries in every whole-
sale transaction. The merchant who had earlier
marketed wares abroad had at this time almost given up
the practice, because now merchants from all over Eur-
ope were actively buying and selling in Bruges. Direct
dealing between one foreign merchant and another was
prohibited so a complete profit was assured for the
local merchants: the entire turnover of goods in Bruges
passed through their hands.[3]

The lively port of Bruges was in all respects the
most prominent harbor of Northern Europe, the place on
which all the lines of commerce converged. The form
of the town was decisively affected by trade. A trem-
endous amount of energy and financial sacrifice was
devoted to civic improvement: public buildings and
fortifications were considerable and the huge wall of
1297, at least seven kilometers long, could only be

84

27. Bruges, plan

financed with the help of Italian bankers. Ecclesias-
tical parish churches and an unusual abundance of mona-
steries and hospitals fit neatly together into a complex
whole within the protection of a great encircling wall.
Technical achievements reinforced the sense of pride
in the energetic commercial center. The personal weigh-
ing machines of foreign merchant's associations made
redundant the municipal scales converted from the bal-
ance in 1282. Through representation on the canvases
of Bruges painters, the tread-wheel-driven Bruges crane
achieved a unique fame. Most significant technically
because of its supreme financial importance was the
continual working of the waterway of the town in which
large sums of money were invested. The great sluice of
Bruges was an engineering wonder of its time. The
Wasserhalle was one of the chief markets of Bruges, so
designated because it spanned a canal and brought cargo

by barge into the market from below. But it is the Bruges Halles with its belfry that shows civic architecture at its best: it was the highest expression of the significance of the organization of trade to local government, an indication of dignity, display, a symbol of autonomy and wealth.

Dominated in the middle of its facade by the noble belfry, the Halles commanded the narrow side of the Grand Place. The foundations for the belfry were laid in about 1290 and the wings that formed the Halles and enclosed the courtyard were added in 1364. The belfry tower is comprised of a series of stacked volumes. The two lower volumes were constructed initially; the upper portion of this early tower was finished with a corbelled attic story that recalls the Palazzo Vecchio and flanked at the corners with jutting turrets, a distinctive characteristic of the Flemish belfry that differentiates it from local ecclesiastical towers. Within six years the tower was extended, again finished with the characteristic corbelling and turret features. By 1482, a large central slender octagonal turret with high gothic windows and a lofty fleche crowned the massive lower tower; reducing its heaviness, it gracefully lifted the tower in its entirety skywards. In addition to housing valuable community documents and charters, one of the most important functions of the belfry was the protection of the town bells, a source of local pride that was closely guarded by citizens; during wartime they were not uncommonly confiscated by the enemy upon destruction of the tower. With its commanding height of 270 feet, unquestionably dominating the skyline of Bruges, the belfry and its elegant culmination was probably one of the most impressive urban landmarks in Northern Europe.[4]

The Flemings shared the desire with other peoples of
the world to express their ideals through the erection
of buildings encompassing the spirit of the individual
as well as the community at large. They were consid-
ered industrious and enterprising wherever commercial
success was likely to reward their efforts, they were
religious by temperament, and knew no bounds to their
ambition. Though the Middle Ages is known to have
bequeathed great masterful works of architecture as a
direct consequence of the enthusiasm for spiritual
expression, church building took a secondary place in
Bruges and other Flemish towns for a time. [5] Large,
finely conceived churches were erected, but ecclesias-
tical work was eclipsed by town halls, belfries, market
halls and other secular buildings that arose in response
to the calls of civic splendour and domestic affluence.
The role of the Bruges merchant was in transition:
originally economic achievement resulted from the
efforts of protected producers concentrated in early
guilds, but with the expansion of trade in geographic
and transactional scale, merchants realized their
ability to achieve immense financial gain and the ad-
vantages of an evolving social hierarchy based on
individual enterprise. Their newly acquired wealth was
reflected in a group of commercial and civic building
projects that elucidated the Flemish adaptation of
Gothic architecture. Construction methods and motifs
were borrowed from builders in Northern France, where
experimentation was being conducted by master masons
on the pointed arch and the ribbed vault. The poten-
tial of these forms was too strong for the Flemish
builder to ignore and a building approach evolved that
bore the impression of local market characteristics.

So forcefully were these characteristics developed and

expressed that they markedly differentiated Flemish
architecture of the time from that of any other country.
The Florentines had secularized ecclesiastical motifs,
extending details of Gothic architectural expression to
the contemporaneous Palazzo Vecchio, but the fortress
aesthetic overpowered the Gothic influences leading
Frankl to observe that the facades of the Palazzo can
"only be called Gothic if one applies the term blindly
to anything built during the Gothic period." [6] He
continues with the assertion that Flemish belfries are
Gothic due to their aggregation of Gothic characteris-
tics, for example, the windows with pointed arches and
tracery, the central tower and its pinnacles, the tur-
reted corners, and the steep roof. Unlike Florence,
where the campanile of the Cathedral and the tower of
the Palazzo appear in tandem, in Bruges the belfry reigned
in unquestionable singularity over the skyline: the
phenomenon of Giantism had been transposed to the North.
In its domination of the town, the belfry declared the
preeminence of Bruges as the commercial center of the
north prior to the fifteenth century. [7] Consequently,
in its more direct manifestation of Gothic stylistic
tendencies, and in its indisputable command of the sky-
line, the Bruges belfry assumed a character quite
divorced from conformable town belfries such as the
Florentine Palazzo Vecchio: it came uncomfortably close
to feigning the role of the Gothic cathedral in the
typical medieval town. Considering the pervasiveness
of the Church in western Europe at the time, it appears
obvious in the face of such an anomalous expression
that mercantilism and its display, at least for the
Flemish merchant, had assumed a level of consequence
and meaning rivalling religious pursuits.

90
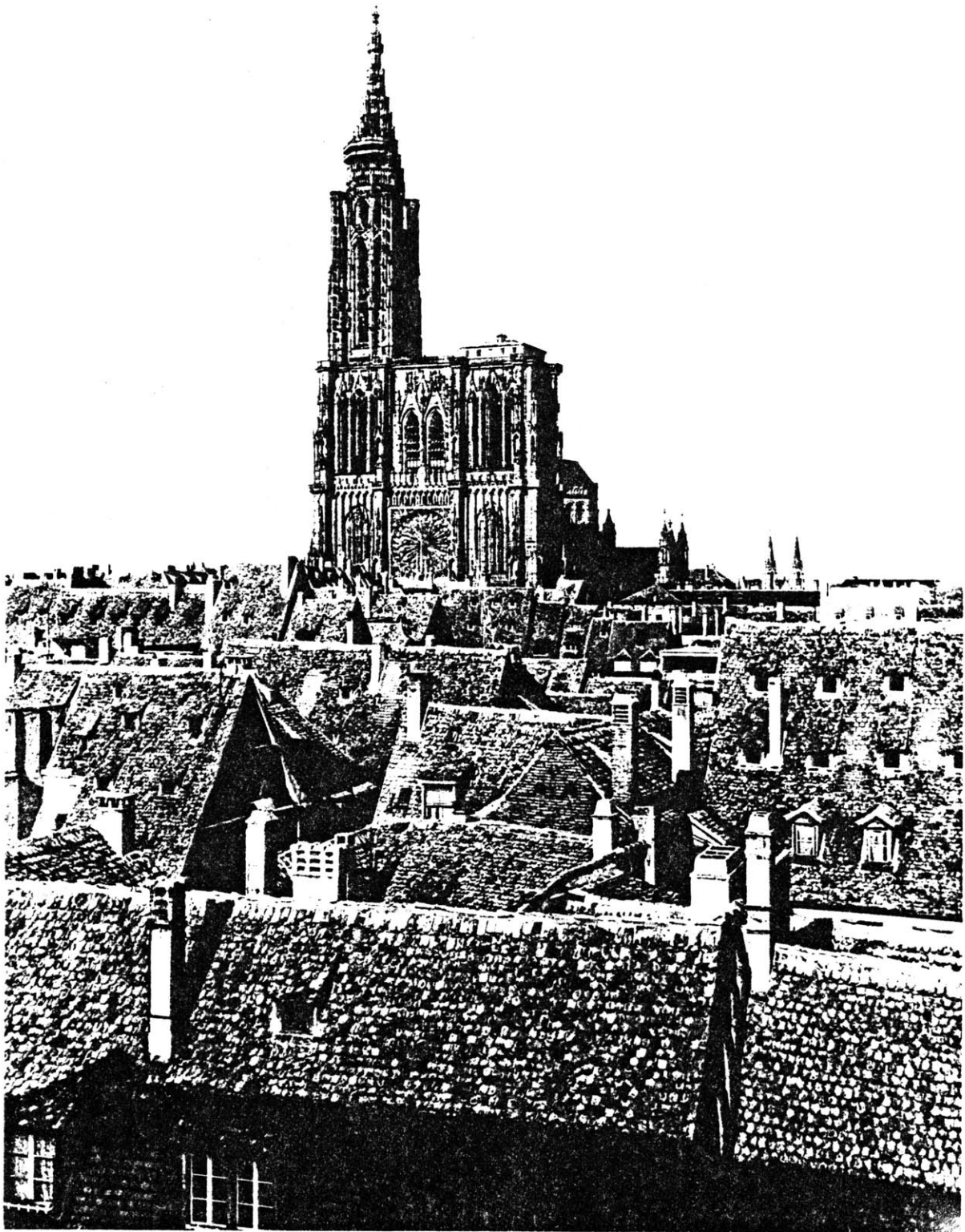
STASBOURG: THE SPIRE

The most pervasive influence in Western Europe after
the fall of the Roman Empire, the Church visually
controlled the typical medieval city: the image of the
community, conceived as an entity by citizens and
builders, was generally expressed through the dominance
of the cathedral spire and recalled in the parochial
churches and civic buildings scattered throughout the
town, generating a design reverberation that provided
richness to the totality. Towers and high facades set
behind short approaches and blocked vistas forced one
not to see a sweeping panorama, but to look skyward.
What was once closed behind the walls of the monastery
was now visible to the entire community: if one building
was to be understood as the key element in the organi-
zation of the medieval town it was the cathedral, the
focus of a collective structure whose main purpose was
to pursue a Christian life.

In the feudal period as cities were formed, with the
increasing power of the bishop many cathedrals under-
went enlargement and improvement. In the most important
towns in Western Germany, such as Strasbourg, the bishop
wielded the political power: his dominion over the
populations had been confirmed in the tenth century by
Ottonian imperial and episcopal policy. Until the
twelfth century it appeared as if the power of the
bishop would eventually transform the entire urban
population into a passive object of the lord's will

28. Strasbourg, the
Cathedral

91

to dominate. But as cities gained economic strength
the authority of the bishop diminished as the power
of the burghers increased. Then began a long period
of altercation between the bishops or lords and the
burghers striving for autonomy that was not to be
resolved until the fourteenth century. This period
of transition in the political life of the burghers
was filled with innumerable instances of bloodshed,
including the battle on the field of Hausbergen where
the people of Strasbourg fought for their will to
govern in 1262. Success for the burgher's movement
was assured when the collective management of the town
was taken over by the central authority of a council,
much like the one that had initially developed in
Italian towns. [1] The bourgeois class with its newly
acquired wealth not only sought greater political
recognition and influence, but expressed its economic
strength through greater participation in the construc-
tion of cathedrals. However, such financial contribu-
tions entitled donors to privileges, especially the
right of burial either inside the church or in adjoin-
ing chapels. To suit this demand required not only a
larger building, but increased subdivision of space.
The inevitable result was the development of rings or
families of parochial churches around the cathedral,
an expression of bourgeois power. Such development
did not detract from the importance of the cathedral
as the symbol, pride and possession of the city. [2]

To filfill the practical needs of everyday life, the
cathedral functioned as a community center: it was
not considered too sacred to be used as a dining hall
for a large festival, a theatre for a religious per-
formance, a forum for oratorical contests among
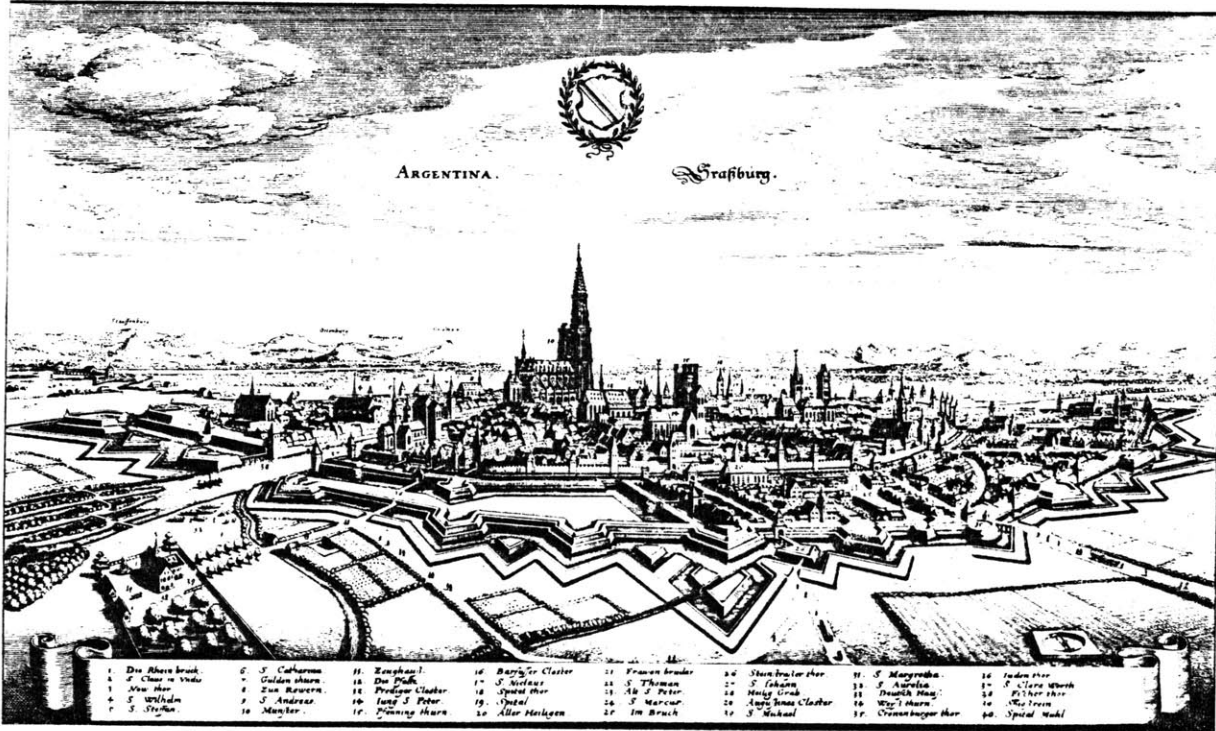
29. Strasbourg, 1653

religious scholars, or perhaps even a safe deposit
box behind the altar where deeds and treasures might
be placed. Because of its visibility from the country-
side and its inevitable association with the town
market, it also functioned as a great stimulus to
the economic life of the country.

Of greatest importance however was the spiritual role
the church filled: it was invested with a symbolic
content relating to man himself, God, and the Kingdom
of God. It was not medieval architects who speculated
on the meaning of the church but theologians such as
Suger and Durandus. Durandus, whose The Symbolism of
the Churches was considered to be commentary of the
highest authrotiy in the thirteenth century, was par-
tially responsible for early liturgical formulations
on the cathedral as a representation of the City of
God or the Heavenly Jerusalem, upon which all medieval
authors agreed:

93
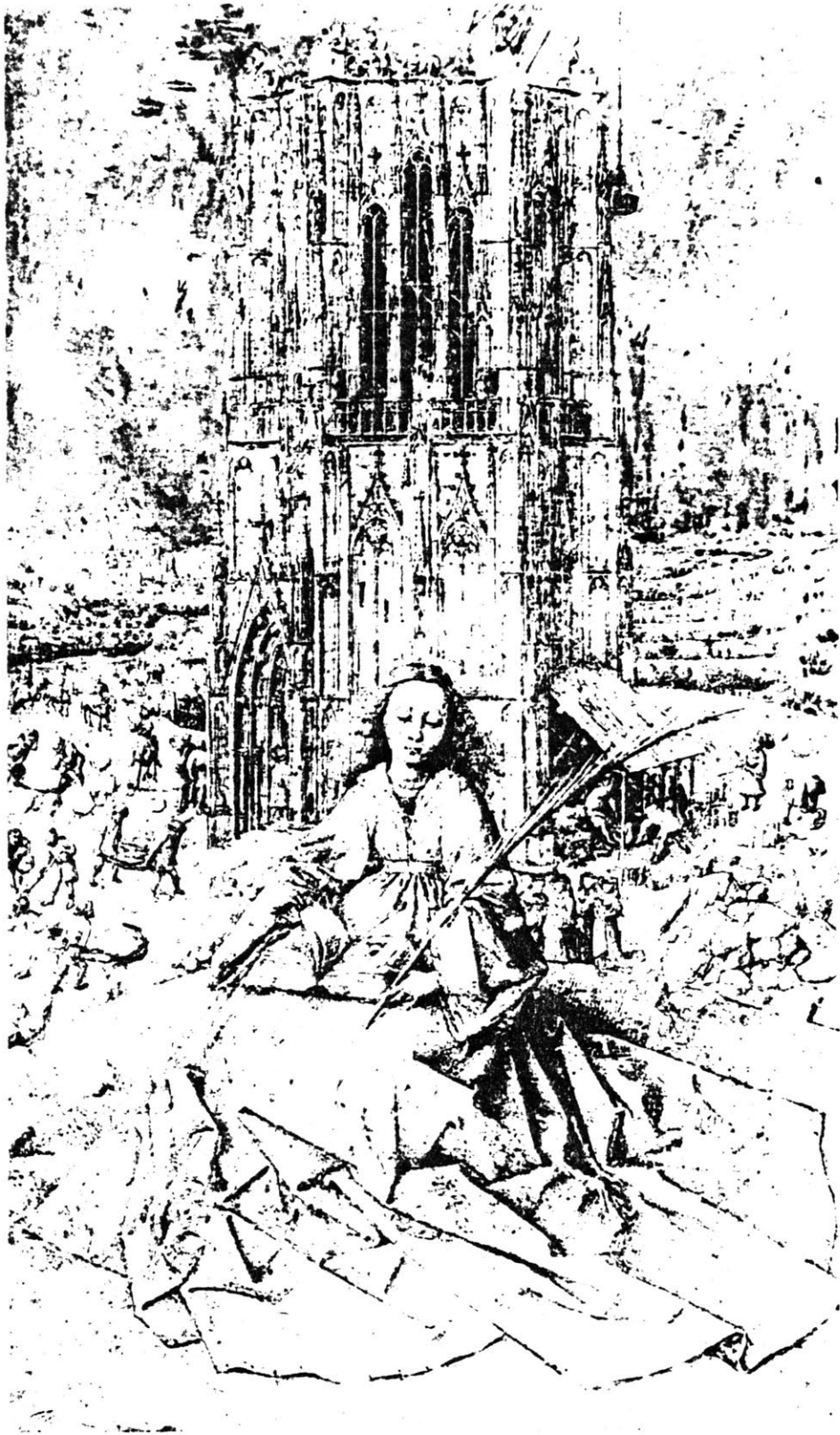
> And I John saw the holy city, new Jerusalem,
> coming down from God out of heaven, prepared
> as a bride adorned for her husband... And he
> carried me away in the spirit to a great and
> high mountain, and showed me that great city,
> the holy Jerusalem descending out of heaven
> from God. [3]

This is followed with a description of the city, which
is called the city of Light. The walls consist of
twelve kinds of precious stone, and there are gates
on every side, each gate consisting of a single pearl.
The gates are named after the twelve tribes of Israel
and the foundations of the wall after the twelve
apostles. The streets were made of pure gold, as if
it were transparent glass. The city, its dimensions,
its geometrical form, precious stones, pearls, gold and
glass, are all symbols and in combination symbolize
the Kingdom of Heaven. Durandus continued his dis-
cussion of the cathedral as Heavenly Jerusalem through
the attachment of significance to particular parts of
the earthly structure, here specifically referring to
the towers.

> The towers are the preachers and prelates of
> the church, which are her bulwark and defense.
> Whence the bridegroom in the Canticles saith to
> the bride, "thy neck is like the tower of
> David builded for an armoury." The pinnacles
> of the towers signify the life or the mind of
> a prelate which aspireth heavenwards... [4]

For Durandus, the physical act signified the spiritual
reality and the material building signified the realm
of the immaterial. He believed that the living
stones of earth would one day be part of Heavenly
Jerusalem and that the citizens of both earth and
heaven are in communion and both participate in the

30. Jan Van Eyck, St.
Barbara before a
Gothic Tower,
1437

95
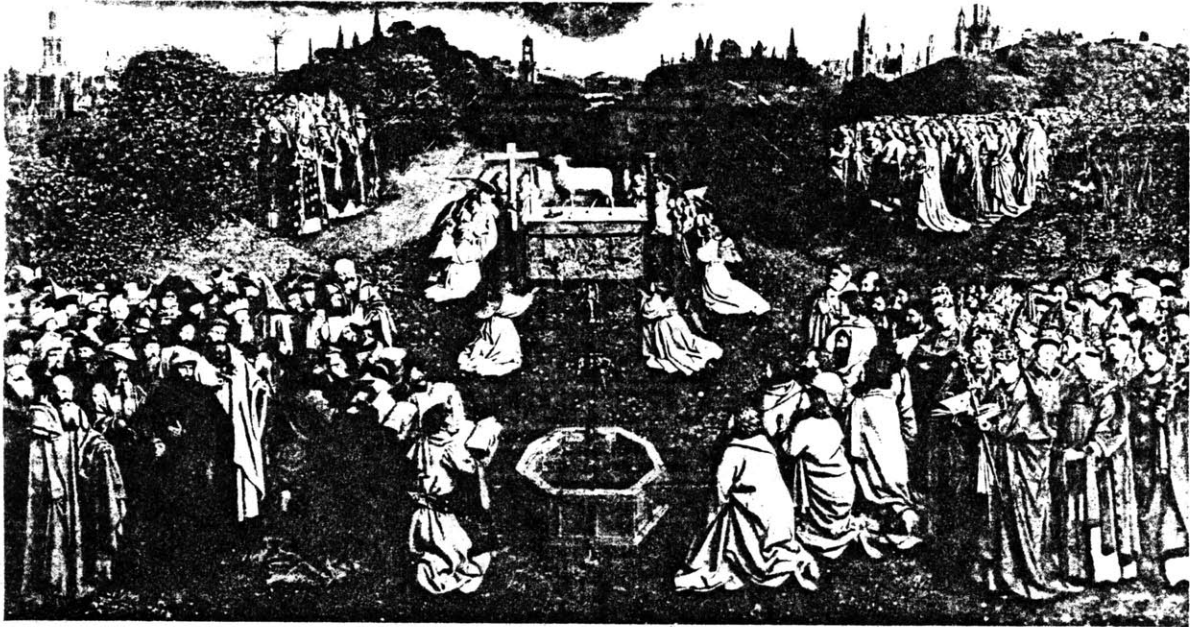
31. Jan van Eyck,
    "The Adoration of
    the Mystic Lamb",
    Ghent Alterpiece,
    1432

symbolism of physical building. The towers are a
signification of the intimate connection between earth
and heaven. [5]

The meaning of the tower, one of the most prominent
components in the assemblage of the cathedral, has
been a source of varied speculation and interpretation.
In a painting of St. Barbara by Jan van Eyck, the
Gothic tower of monumental proportions looming in the
background embodies the medieval sense of spiritual
devotion as expressed by St. Paul who claimed that all
Christians were "god's builders" working incessantly on
a structure not to be completed until the day of judge-
ment. In Flemish tradition the symbol of the tower
originally signified that Barbara had been imprisoned
by her pagan father to protect her beauty from defilement.
According to the legend, her father discovered her
conversion to Christianity after she caused the workmen
to build a chapel with three windows as opposed to a
bathhouse with two as he had authorized.[6] Jan van
Eyck transferred the tower of imprisonment to the tower
of a cathderal in the course of erection, calling to
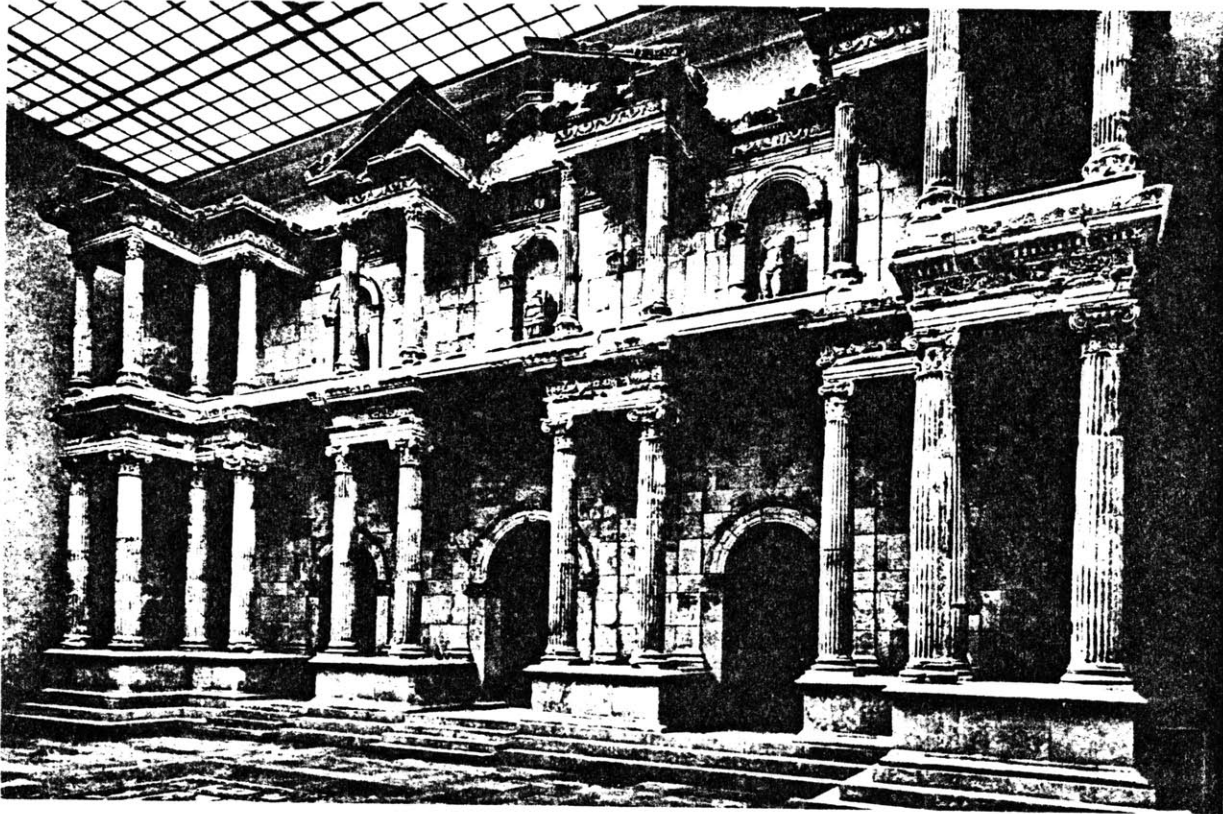
32. Miletus, Market
Gate, c. 160 A.D.,
reconstruction

mind Durandus' relationship between the physical act
and spiritual reality. The concept recurs in Jan van
Eyck's representation of a city in "The Adoration of
the Mystic Lamb" in the Ghent Altarpiece. The agglo-
meration of towers, though they are non-institutional
in character, and though they are associated with the
Romanesque style represent the same aspect of spiritu-
ality and ultimate goodness that the Gothic cathedral
embodies in its representation of the City of God. [7]
This idea of the city is echoed in the entrance front
of the cathedral. Otto von Simson discovered in the
facade of St. Denis a source in the reconstruction of
the Roman gate at Cologne: the twin-towered cathedral
facade with its three portal openings is a "veiled
representation of the city gate." [8] The gate at Col-
ogne was similar in scheme to such Roman gates as the
Harbour Gate at Ephesus and the West Market Gate at
Miletus where the three portal openings alternated

97

with four ionic distyle projections. The architecture

98
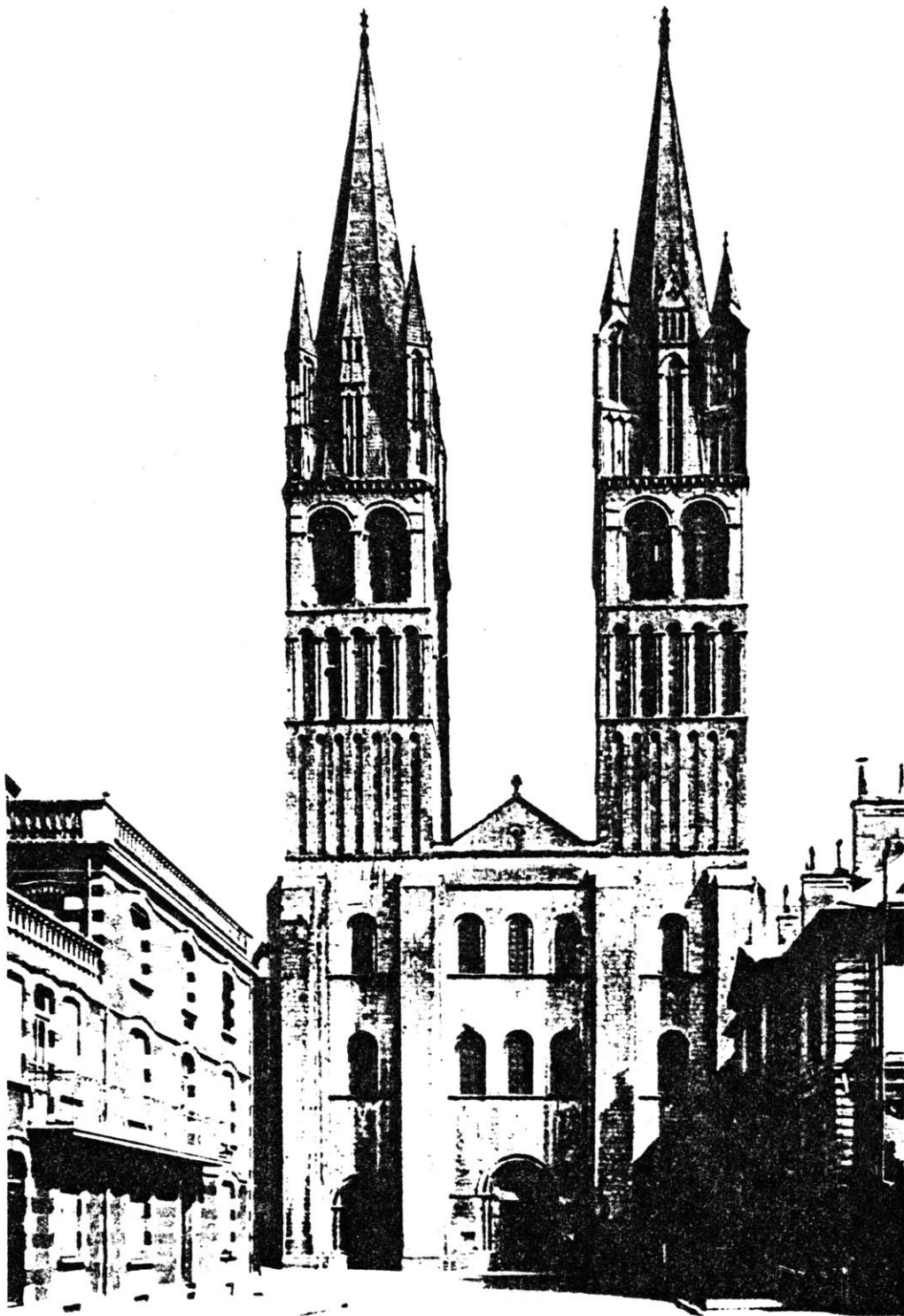
of the columnar facades was inspired by the stage-
building of the Roman theater, gradually rationalized
and monumentalized to meet the requirements of everyday
public building. [9]

In the development of the tower and spire in relation-
ship to the cathedral, the reconciliation of the
vertical expression of the towers with the horizontal
length of the nave posed an intricate problem for
Gothic architects. In solving the issue of the twin-
towered facade, the special features of the building
on the west, north and south fronts had to be brought
into harmony with the nave elevations. It was important
that the towers appeared to grow organically out of the
main structure below them. Two contradictory demands
had to be met: the expression of the basilical interior
on the facade and the incorporation of the towers as
flanking features into the cathedral front. In addi-
tion, the facade had to accommodate great portals
leading into the nave.[10] The Romanesque architects
had faced similar challenges in the integration of the
westwork with the front of the basilica. Their varied
resolutions of the interrelationship of the entrance,
the towers, and the nave to the west front were to
become a final cohesive solution in the hands of Gothic
architects where in the plasticity of the facade every
detail reinforced the larger scheme. The immutable
organization of the Gothic twin-towered facade was
derived primarily from eleventh century Norman fronts
such as St. Etienne at Caen. Here the massive sub-
structure was divided into three sections, each con-
taining an entrance corresponding to the aisle of the
interior. Buttresses guide the eye towards the
towers as they rise continuously from the self-contained

33. Caen, St. Etienne,
    west facade

99

block below. As a whole it is a straightforward, cohesive solution that satisfied the early demands of both the towers and the facade. [11] In Gothic Architecture and Scholasticism, Panofsky discusses the development of the classic phase in Gothic architecture, indicating that progression was consistent but not direct. Using the classic solution of two front towers as an example, he questions the reason for the roundabout approach that began with the twin-towered front of St. Denis, progressed to the multinomial group of towers as exemplified at Laon and in the initial plan for Chartres and eventually to Amiens, where finally the initial disposition of only two front towers was reinstated. Although this may at first appear to be an arbitrary deviation, he believes it is in reality the prerequisite of the final solution. The many-towered group at Laon was an effort to vertically balance longitudinal and centralizing tendencies. As if in protest, or perhaps because their cathedral was on the crest of a hill, the masters at Laon reverted to the use of many towers, a gesture reconciled only in the construction of two more cathedrals by succeeding generations where towers surmounting the transept and crossing were successively removed. With the construction of Amiens the contradictory ideals of the uniform progression from west to east and of transparency and verticalism, expressed in the disposition of towers and spires, had finally achieved reconciliation. [12]

The spire was the most powerful expression of the heavenward urge on the part of the Gothic builders. It also perhaps more than any other feature marks the communal spirit, along with municipal power and

prosperity as the governing feature of the medieval town. Prior to the twelfth century nothing like the true spire had existed, no precedent was available to guide constructors. The schools of the Ile de France and Normandy advanced along similar paths, but it was probably at the Ile de France that the Gothic spire was developed. It is difficult to determine what the exact stages of progression were as it is always possible that a spire was added to a tower long after completion. However, in the Ile de France it is possible to trace the evolution of the spire in the twelfth century through a series of towers beginning with the plain pyramidal roof to the forms where the transition is crudely facilitated by means of angled turrets and dormers until the fully developed spire emerges. In the skillful transition from the square base to the upper reaches of the diminishing octagonal pyramid, the eye travels smoothly, scarcely noticing a change in form. As in every other part of the edifice, perseverance in this transitional period made possible the final perfection of the Gothic form. The roofs of Romanesque towers were closed and could only be reached from the inside, but Gothic spires allowed the interior and exterior to merge, symbolizing the disappearance of the boundary between God and man. [13] An impression of effortlessness is conveyed. For this reason the most Gothic of all spires according to Frankl is Strasbourg: when progressing up through it one is paradoxically inside and outside at the same time. [14]

The first design for the facade of the cathedral at Strasbourg, or Plan A, was made either by the elder Rudolf who was working on the choir in 1240 or the

younger Rudolf who was completing the western bays of the nave. The second facade design, Plan B, was created by Erwin in about 1275 and constructed to a height of 65 feet until interrupted by a fire in 1298. Dehio called it "the most beautiful thing that was ever devised in the Gothic style anywhere in the world".[15] However, the upper parts were executed under later designs, in the end creating a facade of disparate elements appearing to lack harmony. At the time Ulrich was working on the facade at Strasbourg it was decided to have only one spire, so when Master Gerlachus had completed the north tower in 1365 he added between 1384 and 1399 a central piece over the rose-window with the intention of building above it. At this point Ulrich suggested instead that the north tower be continued asymmetrically. He lived to see the octagon and four octagonal turrets completed, but their spires were never built.

Ulrich had originally designed the spire for the tower at Strasbourg beginning in a concave recession with four ascending groups of eight pinnacles on the ribs above it. Dehio viewed the pinnacles as "stuck on candles" and said the outline of the tower "would have looked delightfully blurred from a distance."[16] Johannes Hültz, continuing the work in 1419, developed from this plan seven wreaths of short turrets in which one is able to climb an open spiral stairway to the top to observe the surroundings. The fifty-six little towers were intended to carry spires that were never built. The contour of the tower in its intricate jagged outline shifts continually from foreground to back-ground.[17] Rising high above the town roofs, it is a cage of tracery, an aerial fantasy that represented

the aspirations of the designer and the age in its
originality and technical mastery. Deeply impressing
later generations, it is because of the spire that the
tower at Strasbourg has been claimed the eighth wonder
of the world. [18]

Because of its exemplary Gothic quality, its majesty
and perhaps simply because of its height of 467 feet
that for a long time made it the tallest structure on
earth, the tower and the cathedral at Strasbourg have
been continually praised over the years from the time
they were created to Goethe's day and down to the
present. Aeneas Silvius (1405-1464) was a self-
taught Humanist, geographer and historian who subject-
ively, yet critically, observed the cities in Europe
of his day. After a discussion of Strasbourg and its
canals he turned to the cathdral:

> ... the episcopal church, called the minster
> built most magnificently of cut stone, rises
> as a very extensive edifice, adorned with two
> towers, of which the one that is completed,
> an admirable work, hides its head in the clouds. [19]

Silvius considered the tower of Strasbourg a _mirabile_
opus. In his laudatory enthusiastic remarks, surprising
in their favor of the Gothic when considering they are
the words of a Humanist, are found the beginnings of
Goethe's panegyric of 1772. He continues, according
to Wimpheling's history of the German people, _Epitome_
rerum Germanicarum of 1502:

> In my opinion, the Germans are wonderful mathe-
> maticians and surpass all peoples in architec-
> ture. An Italian asserts this of the Germans,
> and he has not said anything untrue, as is
> abundantly proved by the cathedral in Strasbourg,

and the tower connected with it, even if one
ignores the other buildings that have been
erected on a most magnificient scale elsewhere
in Germany. Who can admire enough or praise
enough the Strasbourg tower, which easily
surpasses all buildings in Europe in its
carved ornamental work, statues and sculpture
of manifold objects and which has a height
of more than 415 ells? It is a miracle that
one could raise anything to such a height. [20]

For Silvius the concepts of mathematics and architecture
were identical; he admired the geometrical method of
German architecture. Wimpheling was amazed with the
mechanical achievement of raising stones to the height
of the Strasbourg tower. [21] Laugier, a Jesuit priest
born in 1713, found that the Gothic alone expressed
the intent of the Catholic church. He was confused
however by the respect he felt he owed to Vitruvius,
Vignola and Palladio. His dithyramb on Strasbourg
has been forgotten in writings on the subject; he is
remembered only for his worship of antiquity:

> Our forefathers excelled in the construction
> of towers.... They discovered the secret
> uniting lightness and delicacy of work with
> elegance of forms; and avoiding equally the
> slender and the massive, they attained that
> degree of precision from which results the
> true beauty of these kinds of work. Nothing
> of this sort is comparable to the tower of
> Strasbourg Cathedral. This proud pyramid is
> a masterpiece, enchanting in its stupendous
> height, its exact diminution, its agreeable
> form, in the correctness of its proportions,
> in the singular refinement of the work. I
> do not believe that any architect ever
> produced anything so boldly imagined, so
> happily conceived, so precisely executed.
> There is more art and genius in this one
> piece of work than in all the marvels that
> we see elsewhere. [22]

At this point he grows reserved and solemnly suggests that towers of this type, differing from modern structures, should not be imitated despite their attributes. Goethe probably read Laugier's enthusiastic words of praise for Strasbourg prior to writing his own version, called a masterpiece of the highest rhetoric in the sense that language is used to captivate and intoxicate the reader:[23]

> It rises like a most sublime, wide-arching
> tree of God, who with a thousand boughs, a
> million of twigs, and leafage like the sands
> of the sea, tells forth to the neighborhood
> the glory of the Lord, his master.... All
> is shape, down to the minutest fibril, all
> purposes to the whole. How the firm-grounded
> gigantic building lightly rears itself into
> the air! How filagreed all of it, yet for
> eternity.... Stop, brother, and discern the
> deepest sense of truth... quickening out of
> strong, rough, German soul.... Be not girled
> [sic], dear youth, for rough greatness by the
> soft doctrine of modern beauty-lisping. [24]

To thoroughly understand the way Gothic was viewed in particular periods of time, the view of the Impressionists must be included. This view is perhaps best conveyed by Auguste Rodin (1840-1917) in his book Cathedrals of France. Published late in his life, when the spirit of Impressionism was waning, it is nevertheless filled with an enthusiasm reminiscent of Goethe's earlier writings. With sketches and poetry Rodin provides a vivid interpretation of the spirit of Gothic architecture:

> This cathedral is the scaffolding of heaven.
> It gathers itself for flight, it rises, then
> stops the first time to rest on the balustrade
> of the first tier; then the construction
> resumes its skyward flight. It stops at the
> limit of human powers.[25]

105

He illuminates well the role of the cathedral as the
focus of the medieval town:

> Things appeared to me more lofty, purified.
> They faded to nothing, transformed by glory.
> Lights that emphasized the first planes were
> interrupted to take more power in following
> the ascendent lines, leaving the porches to
> fill with mist, to be dissolved in shadow,
> while beyond, the cathedral thrust its
> audacious framework to heaven. [26]

But however overwhelming the superworldly quality of
this architecture and however poetic its conception
or reflections of its inspiriting loftiness and
beauty, one must remember that it emerged in a clearly
defined period of history and that the structural logic
with which it was erected and the precision of its
detail, better described as the "mathmatics of the
classic cathedral", could not have come strictly from
the orientation of a poet. [27]

From the construction of the earliest cathedrals on-
wards, the height from the floor to the keystones of
the vaulting steadily increased. Likewise, a progres-
sive, though indirect, attainment of height was achieved
in the construction of towers, as in many instances
concentrated energy was channeled into completion of
a single higher spire as opposed to two lesser spires.
The pervasive cult of Giantism does not fully explain
the desire of the Gothic architects to achieve expres-
sion of technical acuity in vastness of dimension. A
single constitutent in a larger set of concerns, the
attainment of height was perhaps recognized not as an
end in itself, but rather as a final compensation for
careful attention to the integration of a variety of
conflicting constructional considerations. The lofti-

ness of the tower virtually relegated the previous
utilitarian functions of belfry or watchtower to insig-
nificance: a climb to the spire was a time-consuming
undertaking and the bells lost prominence in their
distant location. Instead, the spire not only contri-
buted to the symbolic power of the church as an entity,
but also established the strength of its relationship
with the surrounding countryside. Although in all
probability dulled by the extremely lengthy, arduous
construction process, the sense of competition with
neighboring towns was coincident with the goal of
creating an ever taller, more elaborate structure and
with the conception of the cathedral as an extension
of the city. In its interdependence with the country-
side, the city was the market for local commodities.
As a representation of the city, the cathedral was
inseparable from its mercantile image: the preeminent
tower was a symbol of economic viability, spirit, and
solidarity. Such intense aspirations to propagate the
city on the skyline, to link heaven and earth and to
realize monumental heights had not been attempted
since Babel. But the unquestionable authority and
the pervasive influence of Christianity meant the
current motives for tower building were of another
genre. Perceived as the City of God, the cathedral
was accorded comparable reverence. The tedious con-
struction process was justified by the belief that
building the material church signified building the
spiritual church, the progression towards the day of
judgement, and therefore towards heaven. Such a
building task, and toleration of its slowness and
arduousness was now encouraged by God rather than
condemned. Later interpretations, formulated in the

face of the completed artifact rather than in the

midst of the construction process understandably focused
on the comprehension of visible results, or the aes-
thetic of the cathedral. Such an aesthetic was in
actuality the result of an ardent search by twelfth
and thirteenth century masters who through ideals such
as transparency, the impression of the ethereal; and
verticalism, unsubstantial weightlessness and soaring
space; hoped to give material form to the supramundane.
The massive closed Romanesque towers had been built
under the conception that God was a supreme, unapproach-
able being. The Gothic architects instead acknow-
ledged the Christ in his suffering, and therefore God,
was close to man: the heavy pyramidal Romanesque roof
elongated, dematerialized, transformed into the dia-
phanous spire.

110
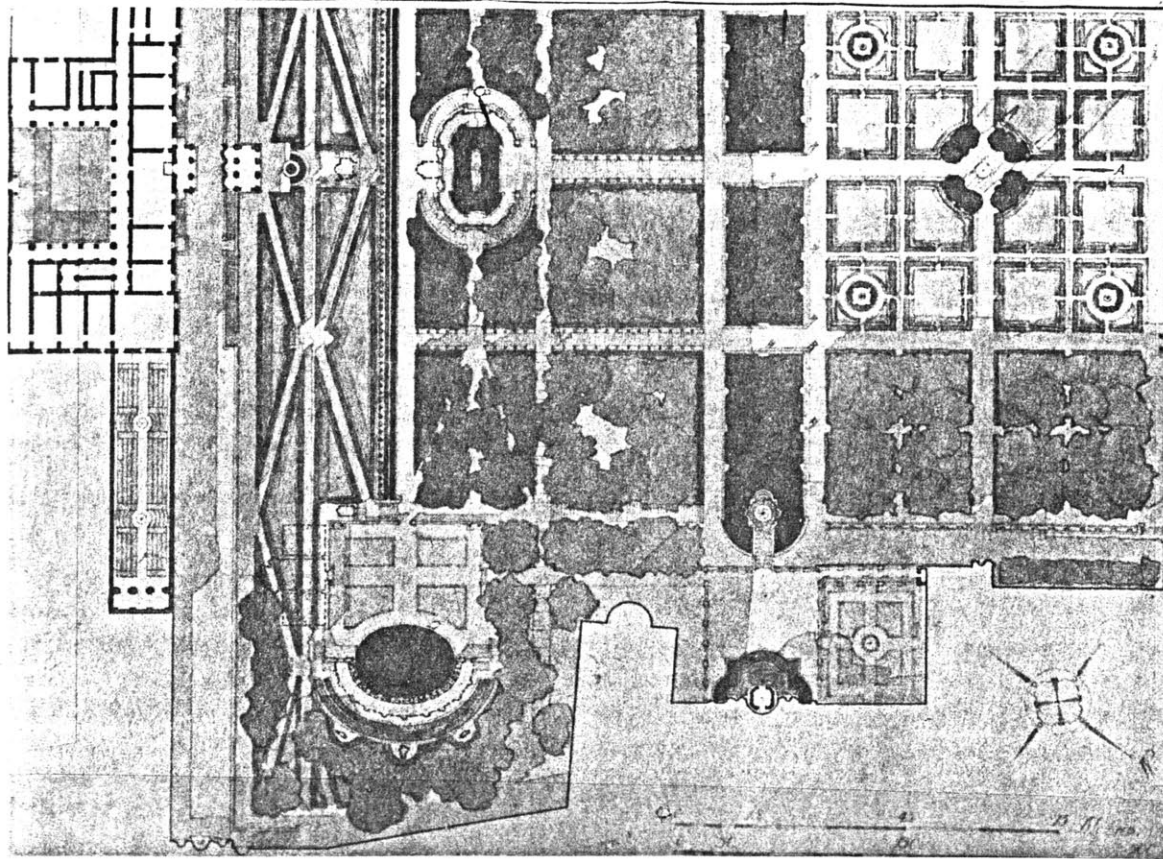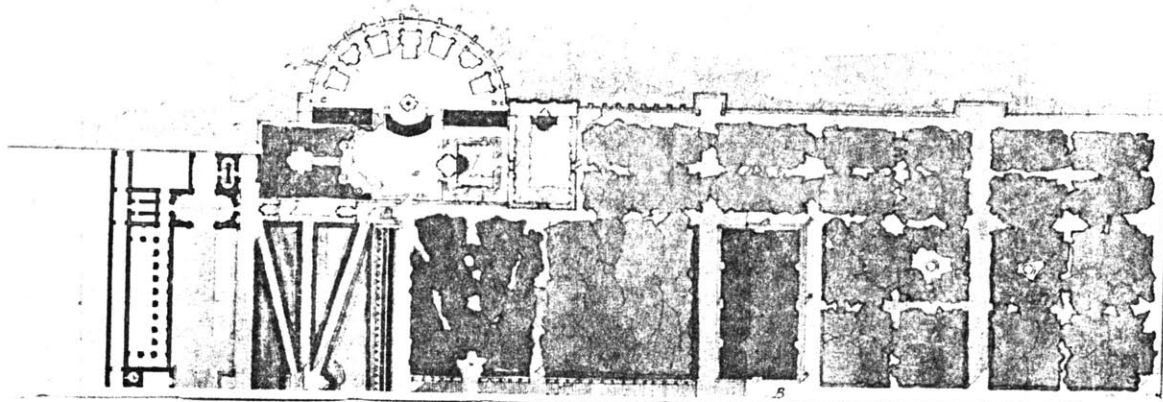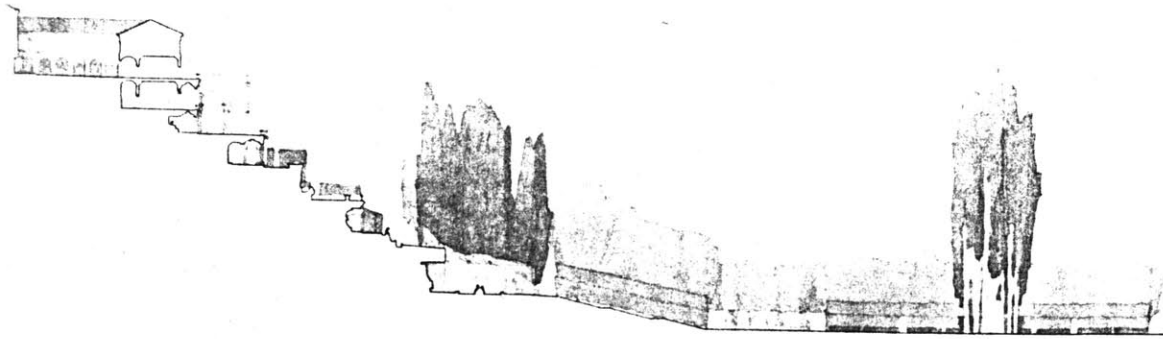
VILLA D'ESTE

In the medieval town the progression was slow through
winding corridor streets and the viewer was able to
appreciate the endless transformations of mass and
silhouette. But in the fifteenth and sixteenth centu-
ries, cities were transformed through opening, clarifi-
cation and the controlled integration of classical
elements. With its air of decorum and regularity the
new architecture broke up the harmonious consistency
in the randomly built character of the medieval town.
Clarity and simplicity was expressed in the two-dimen-
sional facade, the arch, the lintel, and repetition of
formal elements. Implicit in this approach were the
beginnings of the organized, continuous, measured and
extended Baroque conception of space: a change in spa-
tial organization that corresponded with a slow shift
in authority and influence: over the course of four
centuries medieval universality or the absolutism of
God and the Church were to give way to the centrality
of power vested in the temporal sovereign and the nati-
onal state. Rather than concentration on eternal life,
to display wealth and extend power, to concentrate on
what may be mastered in a lifetime became universal
guidelines.

34. Tivoli, Villa d'
    Este, section and
    plan

In the Italian gardens of the sixteenth and seventeenth
centuries, the main concern of the architects was the
organization of space according to the principle of
limited views. The gardens were inevitably linked with
a villa of comparable dimension and usually extended

111

for no more than 200 yards. The garden as an architectural object, perfected and measured, was placed into an irregular landscape, sharply contrasting with the surroundings or gradually merging at the edges. For this reason the villa often functioned as a _belvedere_: the limited controlled prospect offered by the garden was surveyed and enjoyed in addition to the naturally landscaped panorama of infinite distance. The entire symmetrically arranged design was dominated by this all-embracing view. [1]

The earliest example of this type of villa and garden arrangement was the Villa d'Este at Tivoli. Begun around 1566-67 by the architect Pirro Ligorio, it was designed as a "house of entertainment" for Cardinal Ippolito d'Este. [2] Later, it was successively passed to two other cardinals of the house of Este until the seventeenth century when it was inherited by the ducal house of Modena. The length of its facade as originally planned is incomplete. Designed to merge inconspicuously with its surroundings, it is dry and palatial and from the village square only part of the high blank front facade is visible. The street entrance leads to a court enclosed with an open arcade. From a corner in the court a stairway descends to the garden side piano nobile of the villa. A long progression of rooms overlooks the garden. The central room opens onto a great two storied portico or loggia that is connected by a descending outer stairway to a terrace running the length of the building. The villa and terrace, or _belevdere_, tower above the greenery, high and detached, commanding a view of the lower gardens. Descent from this platform is by a grand system of staircases, based on Bramante's prototype of diverging

112

VERO DISSEGNO DELI STVPENDI EDEFITII GIARDINI BOSCHI FONTANE
ET COSE MARAVEGLIOSE DI BELVEDERE IN ROMA

35. Vatican City
(Rome), Cortile
del Belvedere,
Donato Bramante

ramps at the Cortile del Belvedere. From the center
of this high platform to the depths of the garden the
incline is long and steep until it meets the awe-
inspiring infinite green distances and the cypress
shaded pools of the lower garden. [3]

The Villa d'Este was influenced by the Cortile del
Belvedere, part of a papal building program intended
to visualize the new papal policy of the creation
of a national Italian empire, an opportunity provided
by economic crises and the decadence of the nobility. [4]
Here for the first time the natural landscape was
rationalized as an architectural element and the
concept of the belvedere was generated in successive
ryhthmic stages through the manipulation of the terrain. [5]
The cortile was projected to embrace the valley between

113

the palace and Villa of Innocent VIII that rose from
an area of vineyards and gardens. A dual character
was achieved through the use of the wall as a backdrop
for the garden inside and as a city wall facing the
outside. Through extension across the width of papal
territory, Bramante had introduced a new planning con-
cept, bringing to an end the medieval approach of agglo-
meration about a core and substituting spatial growth,
movement and climax, concepts which were later to be
fully realized in Baroque design. One of the greatest
influences on later Renaissance architecture, it encour-
aged widespread development of the garden. When the
construction of the Cortile was far enough advanced to
permit conceptual understanding, almost every villa and
palace in Italy, including the Villa d'Este, was joined
to its exterior with a plan that rationalized the sur-
rounding space seemingly through an outward projection
of the building itself. [6]

Unlike the typical villa suburbana, the Villa d'Este had
slightly protruding wings clearly articulated as towers
that were added on its garden facade in 1569, after its
completion. An engraving by Duperac shows the towers
topped with two turrets that rise above the building
roof, another form of <u>belvedere</u>. As the broad flat
platform upon which the villa rests raised high above
the garden below, even the low towers "command a fine
view". Though the two <u>belvederi</u> were never built, the
towers were constructed in preparation for a visit to
the villa by Pope Gregory XIII that took place in Sep-
tember 1572. It was mainly for this event that the
villa received its final form. [7] According to van Moos
the towers openly alluded to traditional images, includ-
ing Lombard castle architecture, and were used in papal

36. Tivoli, Villa d'Este, bird's-eye view from the northwest, engraved by Etienne Dupérac

building campaigns where they functioned as "highly visible images of power" or as representations of papal sovereignty over public life. [8] Increasing political and economic power of the papacy had recently provided the circumstances for a papal dictatorship. In subsequent building campaigns, of which the Cortile del Belvedere was a part, the tower articulations were used repeatedly on such projects as the Palazzo S. Biogo and the Palazzo dei Tribunali. The explanation for the choice of the articulations lies not only in examination of formal antecedents, but in an understanding of the motivations behind their use. They appear in the Senator's Palace at the Capitol complex, which is not dissimilar in scheme from the Villa d'Este, where according to van Moos, they reflect associations of the interdependence of the commune and the papacy during the

115

Middle Ages in their struggle against the overpowering presence of the nobility. The symbolism of the Capitol is also linked with genius loci; as the symbolic center of the city it has never ceased to be understood by Italians. The later use of the tower articulations in papal building campaigns was not intended to directly interface with well-defined political programs, but had more to do with the political advantage gained in stabilization of certain political institutions in their relationship to the public realm. Architecture was considered a mass medium in service of the Church and its ideology: political power was legitimized through an expression based on the traditional concept of the "fortified palace of the ruler".[9]

Consequently, the imagery of the fortress and its articulated corner towers as a means of legitimizing power had been carried into the Renaissance, where it was used by papal authority to gain the complicity of citizens through signification of the authority of the papal state. Yet in the meantime the authority of the papacy was undergoing challenge from the Reformation and the growth of nationalism. The notion of control of the landscape, beginning with the Cortile del Belvedere and achieving prevalence in the Italian garden paralleled the fragmentation of religious unity. Early notions of perspective and horizontal extension into space, also embodied in the Cortile, soon became the tools of the sovereign ruler: the Baroque image of authority became the palace at the end of the vista, epitomized by Versailles, paradoxical as it seemingly disappeared into the horizon, an image that unlike earlier images of authority lacked dominance or assertiveness from a distance. As if exhausted, the projects of the Early

Renaissance, beginning with Brunelleschi's Old Sacristry in San Lorenzo, were almost miniature in scale in comparison to the achievements of the Gothic builders. The tower had lost significance. But the early rationalization of the landscape that appeared in Renaissance garden design could not truly be appreciated unless viewed from a high place. Contemporaneous with the Villa d'Este was Palladio's Rotunda; unlike his previous villa designs it was not intended to be a villa at all, but a belvedere, it was built specifically for a hill-top view. Palladio designed it as if its chief function was to promote gazing at scenery. Although in this instance the view was not of a garden, but of patterns of husbandry, it was nevertheless controlled landscape.[10] For such organization of space to be appreciated, it had to be viewed from a position that enabled the observer to visually encompass the rationalized vista. The belvedere was initiated, not a tower, but an architectural device that offered in its elevation over the landscape the tower-like advantage of appreciation of the newly significant view.
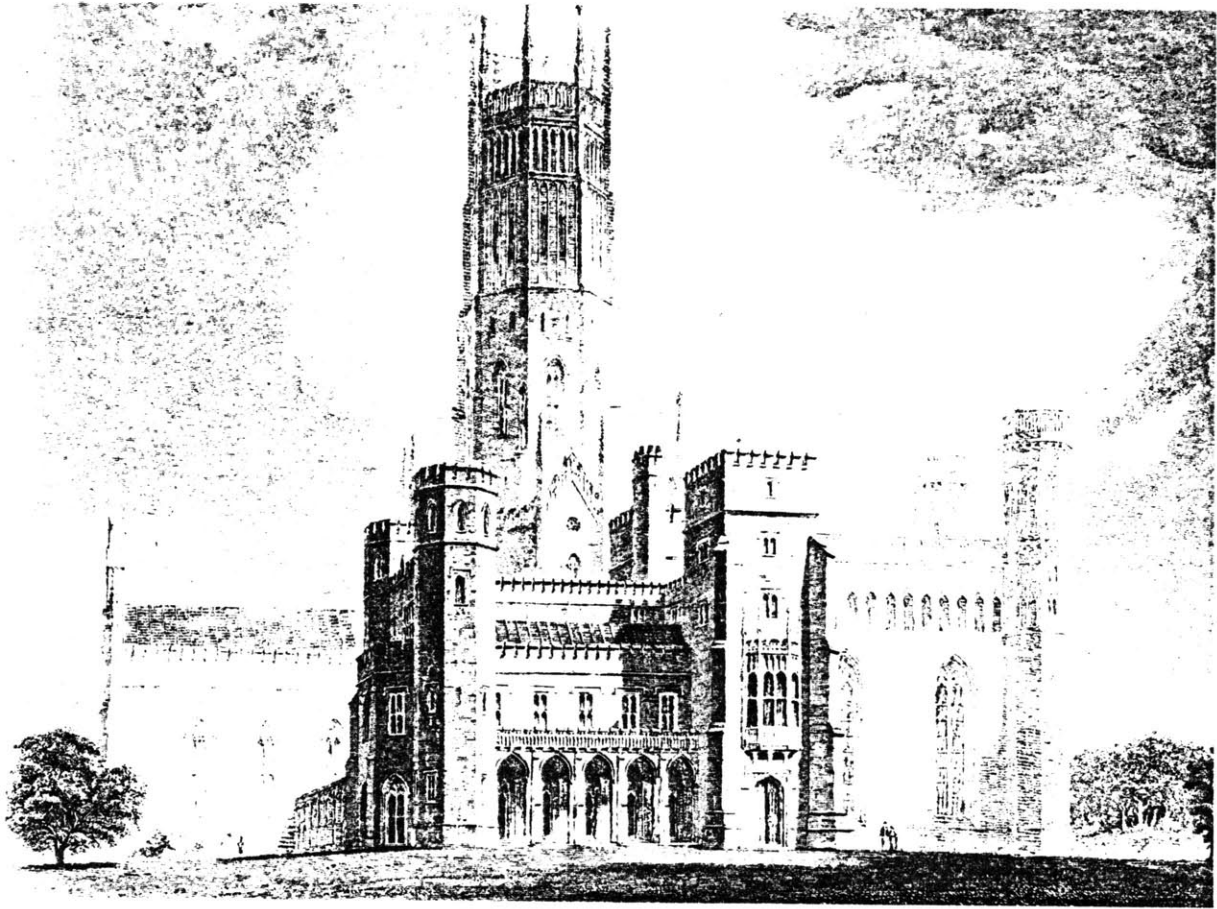
FONTHILL ABBEY

Born in 1760, by age eleven William Beckford was a
millionaire. But despite the advantages of this kind
of wealth, the Grand Tour, and friends among the cul-
tured and influential, he somehow became isolated from
the political and social career expected of him. As a
young man he was carefree and irresponsible and even-
tually his "uncompromising and outrageously unconven-
tional behavior" generated a public censure that forced
him into a reclusive existence from which he only occas-
ionally emerged. [1] Left to his own resources as the
only escape for his introvert mentality, he channeled
his energies into intellectual activities and sharp-
ened his skills as a collector of the old and the rare.
This period of isolation had the fortunate aspect of
becoming an occasion for a tremendous volume of
literary production. His most influential contribution
to the literature of his time was Vathek, a recognized
successor to Walpole's Otranto.

Walpole's horrifying and romantic story, inspired by
a dream, was set in an atmosphere of medieval chivalry
and melodramatic superstition. Though it was super-
ficial to the extreme, it became a spectacular success
and had many imitators. Vathek possessed greater
depth than many of the romances of the period, including
Walpole's: though also dream-inspired it was autobio-
graphical and therefore more substantive; the chief
characters were easily identified with those who
had exerted an early influence on Beckford's life.

37. John Martin, Font-
hill Abbey, view
from the south

119

Works such as these stirred the popular imagination of the time and were in themselves sufficient to explain the sudden desire for a romantic country villa, a dream Beckford himself engaged in. His goal was to create a domain over which he would have complete control, one that would challenge the greatest buildings of the time as a shrine of beauty and solitude. Considering his approach, it is hardly surprising that those who resented him were later to claim that all the voluptuous excesses of Vathek were being re-enacted behind the walls of Beckford's secluded guarded estate.

Beckford had been obsessed with heights and towers all his life. He described at age seventeen an imaginary tower that he would build to escape from "the land of men" into "an air uncontaminated with the breath of wretches, the objects of our contempt and detestation."[2] This account may be regarded as a preliminary attempt at defining the motives behind his hero Vathek's desires for building a tower of 11,000 stairs in order to look down upon "men not larger than pismires, mountains than shells and cities than beehives."[3] On a visit to St. Peter's he imagined constructing a small tabernacle in the lantern of the dome so that he could survey the city whenever he felt inclined. His most cherished experience in Venice was a climb to the top elevation of St. Mark's campanile. He was enamoured of tower paintings and possessed a version of the Tower of Babel by the painter Valckenborsch.[4]

Upon the retraction by William Pitt, a boyhood friend, of a political mission originally entrusted him by the Regent of Portugal, Beckford was driven to a state of defiance and bravado. He decided that instead of a few

romantic ruins as he had considered originally, he
would build a villa of enormous scale, style and
magnificence, one that had never been seen before in
England, and one that few people would ever see.
Rather than drinking to unhappiness as some people
did, he claimed instead he would build. This led him
to commission the architect James Wyatt to design a
conventional building attached to a gigantic tower. [5]

Hundreds of workmen were employed at the construction
site and the work proceeded without fanfare for the
course of a year, with the exception of a few large
feasts for all parties involved. Wyatt's drawings
were placed on exhibition at the Royal Academy. Then,
as an early spring gale tore at the cloth fastened to
the tower, the entire structure crashed to the
ground. Not to be deterred, Wyatt chose a new cement,
supposedly known for its strength and durability and
started a new tower. Beckford travelled to Portugal
expecting to return to a completed villa at Fonthill
where he could renounce the world by shutting himself
in the towered structure forever but he was in fact
surprised and filled with dismay by the lack of progress
made during his absence. He galvanized Wyatt into
action and construction continued with an unprecented
haste. It was perhaps for this reason that part of
the tower collapsed a second time in a storm in 1800,
forcing Wyatt to drop all of his other committments
and rebuild the tower in order to make it available to
Beckford for the purpose of meeting prearranged social
engagements. Despite these contruction fiascos,
Beckford managed to retain his initial excitement for
the construction process, as indicated in his

description of the building site at night from an observation height of about ninety feet:

> It's really stupendous, the spectacle here
> at night - the number of people at work, lit
> up by lads; the innumerable torches suspended
> everywhere, the immense and endless spaces,
> the gulph below; above, the gigantic spider's
> web of scaffolding - especially when,
> standing under the finished and numberless
> arches of the galleries, I listen to the
> reverberating voices in the stillness of the
> night, and see immense buckets of plaster
> and water ascending, as if they were drawn up
> from the bowels of a mine amid shouts from
> subterranean depths, oaths from Hell itself,
> and chanting from Pandemonium or the synagogue.[6]

It was not until autumn of 1809 that the scaffolding encasing the tower was removed. In 1813 the eastern transept with its end turrets was completed, but the eastern wing was left unfinished due to Wyatt's sudden death in a coach accident.

The villa was approached by the three-quarters of a mile long Great Western Avenue. The trees that delineated the road were planted not in straight lines but in clumps of various kinds and numbers forming an impervious thicket carefully incised with a wide path. The towered villa loomed in the distance, set against a dark background of firs and oaks. As an arrangement it was carefully contrived, an exemplification in architectural form of a recollection from Uvedale Price's Essay:

> All the characteristics beauties of the avenue,
> its solumn stillness, the religious awe it
> inspires, are greatly heightened by moon light.
> This I once very strongly experienced in
> approaching a venerable castle-like mansion

38. Fonthill Abbey, section
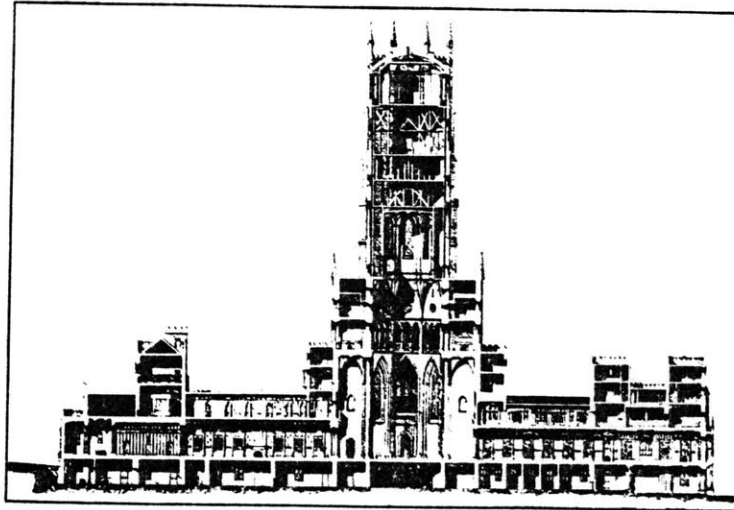
built in the beginning of the 15th century;
a few gleams had pierced the deep gloom of
the avenue; a large massive tower at the end
of it, seen through a long perspective, and
half lit by the unceratin beams of the moon,
had a grand mysterious effect. Suddenly a
light appeared in the tower; then as suddenly
its twinkling vanished... again more lights
quickly shifted to different parts of the
building and the whole scene most forcibly
brought to my fancy the times of fairies and
chivalry. [7]

Fonthill Abbey was constructed of four vast extravagant
wings radiating from a central octagonal tower 216 feet
high. From the salon in the lower part of the tower,
or the Octagon, galleries contained in the wings
stretched for a total of over 300 feet in the north and
south directions. The sleeping quarters of the comp-
leted building consisted of eighteen bedrooms located
on the floors above the galleries and in several turrets
including those clustered about the Octagon. The ground
floor was primarily devoted to service rooms such as
servant's quarters, the kitchen and sculleries. The
Tower staircase rose adjacent to the Octagon wrapping
around an enormous central column; those ascending would
successively disappear and reappear until the landing
was reached in a triforium type of gallery supported by
slender columns called the Nunnery arcade. The stair-

123

124
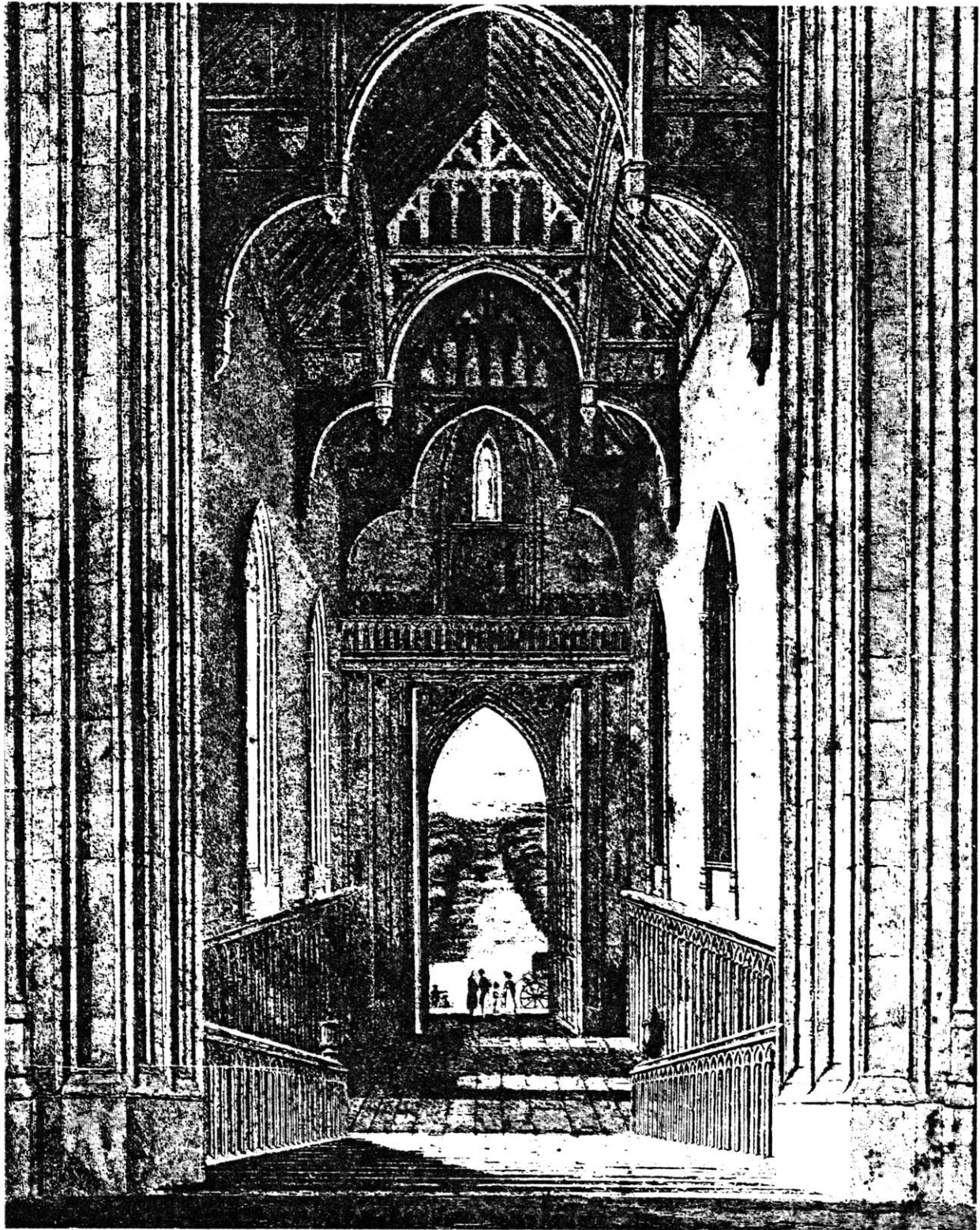
case continued upwards and ended at a location level
with the base of the lantern or the second stage of the
tower where it was possible to make a circular ascent
within the tower or an inclined plane, rising another
35 feet to the skeleton framing above the gallery of
the highest portion of the tower. From this level the
ascent was again by stairs to the Observatory where
comfortable seating was available for repose, and higher
to the windowed Tower Gallery. Therefore, the tower was
intended not only to be viewed as an element of the land-
scape, but to function as a lofty observation platform
from which the countryside could be surveyed.

At grade level, the Octagon was approached by a stair
hall 120 feet high structured with heavy timber carved
and painted to resemble old oak and faintly illuminated
by stained glass windows producing a gloomy dream-like
effect approaching the sublime. On evening gala occas-
ions the notion of sublimity achieved greater power as
shadowy hooded and gowned figures carrying hallway
lighting drifted down the stairs and a distant note
echoed from the galleries. On departure

> ... from this strange nocturnal scene of vast
> buildings and extensive forest, now rendered
> dimly and partially visible by the declining
> lights of lamps and torches, and the twinkling
> of a few scattered stars in a clouded sky, the
> company seemed, as soon as they had passed the
> sacred boundary of the great wall, as if waking
> from a dream, or just freed from the influence
> of some magic spell. [8]

40. Fonthill Abbey,
    stair hall

    125

The villa was originally conceived as an immense piece
of scenery; the third dimension functioned primarily as
a support to provide a sense of distant reality. Struc-
tural considerations were introduced only to bring the

FOUNTAIN

g

COURT

SOUTH EAST QUADRANGLE
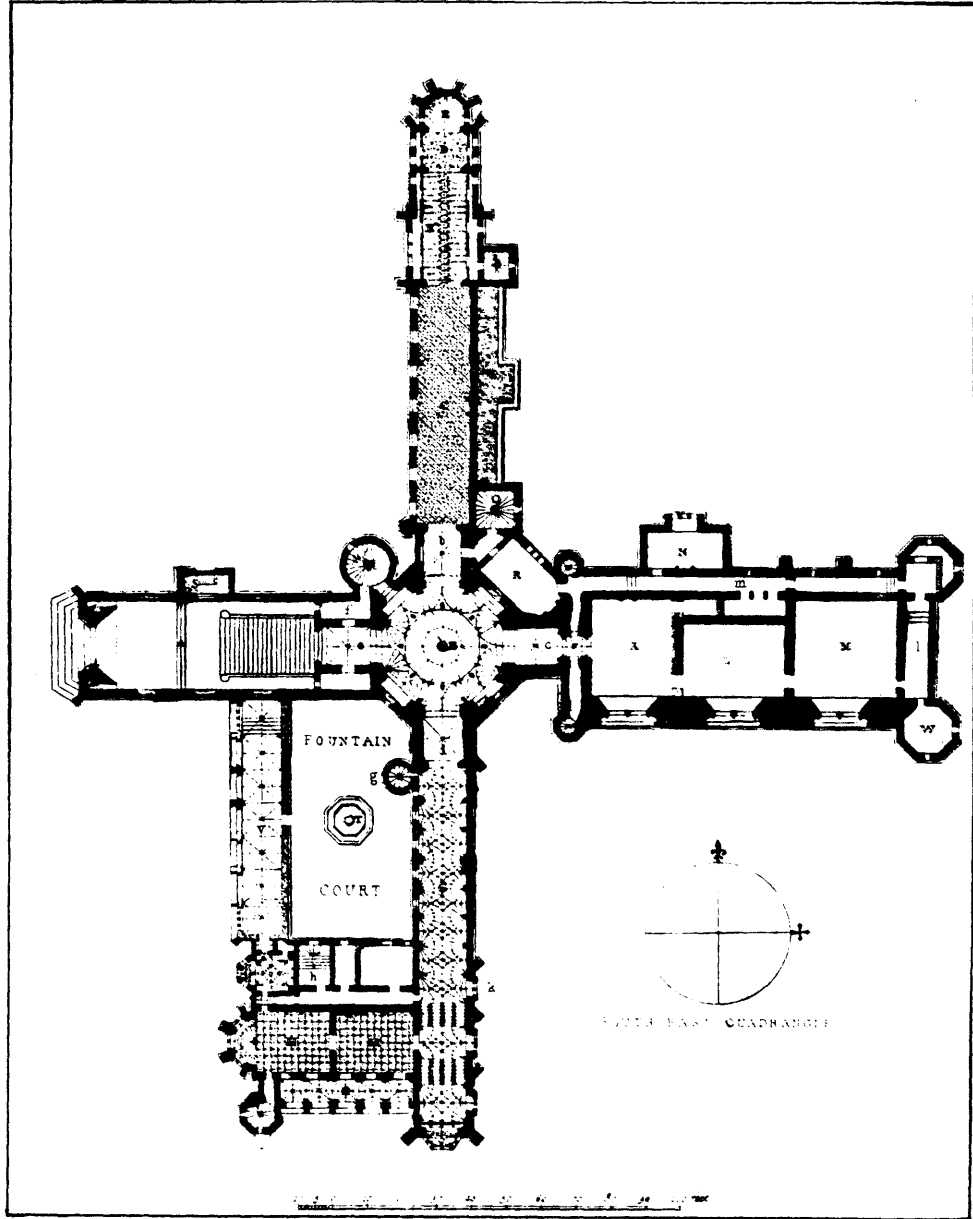
concept from its first stage as a folly of timber and cement to its final one of masonry. As indicated in the absurdity of its internal arrangements, the plan was not considered an organic part of the whole. Compositionally, the Tower demanded either a long main structure or considerable height and substance in its adjacent parts. Both of these approaches were employed in a compromise solution where when viewed from any angle at grade level the plan arrangement appeared massive, however when seen from above the illusion of the thin cruciform shape was revealed. [9]

For young artists and architects Fonthill became legendary; it was considered the highest achievement of the sublime. From the large flat rocky edge of a nearby lake quarried by Beckford, J.M.W. Turner and groups of contemporary artists would sketch and paint the villa in varying dramatic views. In fine weather the representations were ethereal and in stormy weather they were demonic, veering swiftly from one mood to another, seemingly like the mercurial villa creator. It almost appeared Fonthill was designed specifically for the purposes of this type of two-dimensional representation:

> From amidst these the turrets, towers, and
> pinnacles of the Abbey are seen to rise, at
> once crowning the eminence, and presenting
> from different points of view, and under the
> ever changing effects of light and shade, a
> succession of beautiful and interesting
> pictures. [10]

39. Fonthill Abbey, plan

127

English villas of this time, ideally exemplified by Fonthill Abbey were the first type of architecture to be designed in accordance with the new picturesque theory of aesthetics, an approach that unlike earlier
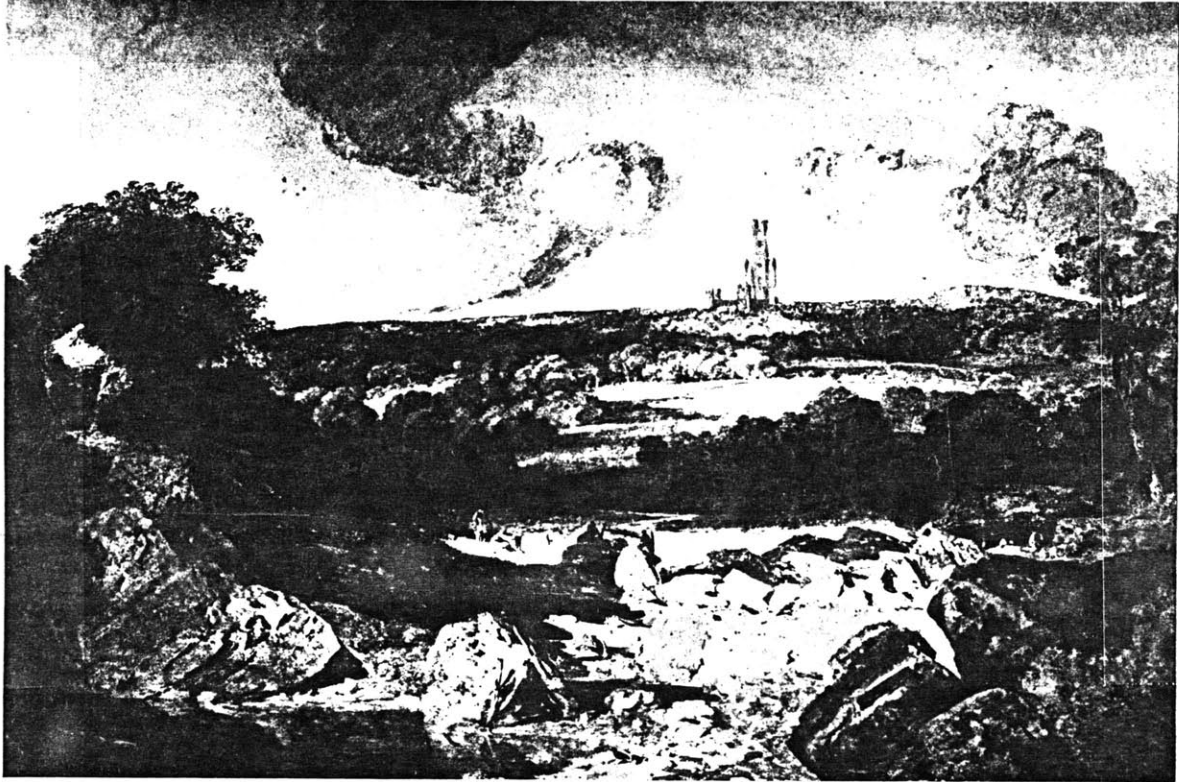
41. J.M.W. Turner,
    Fonthill Abbey,
    distant view from
    the east

thought had little sympathy with the roots of classical
antiquity. Although this approach embraced all of the
arts its premises were based on literature and landscape
painting. Joseph Addison first gave it popular expres-
sion in a series of articles entitled "Pleasures of the
Imagination" published in The Spectator in 1712. He
believed that these pleasures arose first from objects
as we see them with our eyes and second from the thought
of visible objects when they are not present. In this
fusion between vision and the imagination or the objec-
tive and subjective he assumed that virtually anything
could be beautiful because God had provided in every-
thing about him the power of creating an agreeable
impression in the imagination. Therefore

> ... our souls are constantly being delightfully
> lost and bewildered in a pleasing delusion and
> we walk about... like an enchanted hero in a
> romance, who sees beautiful and fantastic castles
> which, upon the breaking of some secret spell,
> will vanish. 11

128

He continues with a discussion on the aesthetic merits
of ugliness, stating that even the imperfections of
nature please.

The theory of aesthetics was defined by categorizing
notions such as beauty, sublimity and the picturesque.
The Vitruvian notion of beauty, though accepted by
Addison, was rejected by later philosophers such as Burke
who claimed in his Philosophical Enquiry into the Origins
of our Ideas of the Sublime and Beautiful that propor-
tion and utility had nothing to do with beauty, supporting
his observation with references to various species of
plants and animals. Most theorists agreed, however, that
it was the notions of the sublime and the picturesque
that possessed the most powerful aesthetic associations.
Fonthill Abbey was considered the most striking architec-
tural exploitation of the concept of sublimity. [12]
According to Burke, emotive qualities, confined to
objects, were perceived by one of the five senses and
instantaneously affected one of the two passions via
the imagination. The two passions were self-preservation
and self-propagation. Self preservation brought forth
an awareness of fear, generating the emotive quality of
the sublime. The attributes of the sublime were obscurity,
power, privations, vastness, infinity, succession and
uniformity. Obscurity was terror-inducing and was an
effect of gloom, an attribute that could be easily
related to architecture. Burke had quoted Milton's
gloomy descriptions where "all is dark, uncertain, con-
fused, terrible and sublime to the last degree." [13]
Gloom was also a characteristic quality of the Gothic
novels of the time, as envisaged in Charlotte Smith's
The Banished Man, where

129

> ... the immense hall of castle Vaudrecour was
> so obscure because of its great height, time
> blackened oak beams and its high narrow windows
> that it was with difficulty that the hero could
> make out the objects with which he was surrounded.[14]

Obscurity was realized in the gloomy interior and the changing moods of the landscaped setting of Fonthill Abbey. The quality of vastness could create a striking architectural effect; Burke believed that height, an intrinsic attribute of the tower, represented the most powerful kind of vastness.[15] For Ruskin in the "Lamp of Power", sublimity was inherent in greatness of scale:

> While, therefore, it is not to be supposed that
> mere size will enable a mean design, yet every
> increase of magnitude will bestow upon it a
> certain degree of nobleness: so that it is well
> to determine at first, whether the building is
> to be markedly beautiful or markedly sublime;
> and if the latter, not to be withheld by respect
> to smaller parts from reaching largeness of
> scale; provided only, that it be evidently in
> the architect's power to reach at least that
> degree of magnitude which is the lowest at
> which sublimity begins, rudely definable as
> that which will make a living figure look less
> than life beside it. [16]

The sublime quality of vastness of dimension created at Fonthill was difficult to obtain in lesser structures, so contemporary architects instead fell under the influence of the picturesque. Wyatt's creation was picturesque only to the extent that it was deliberately situated in a natural landscape and was built in the Gothic style, later estabished as the quintessence of the picturesque. But its scale was too grand and the disposition of its elements lacked the visual quality of randomness. For Hussey, the absence of this effect was a "result of Wyatt's blindness to picturesque architecture

even when confronted with it." [17]

As Beckford grew older, Fontill ceased to be an adventure
for him and he eventually put the estate on the market
in 1822. Public excitement was elevated as visitors
arrived from great distances to marvel at the secretive,
mystical structure to which they never had access. It
was sold by private treaty prior to the day designated
for an auction to an eccentric gun power millionaire
John Farquhar. Then, in 1825, when Beckford was on his
deathbed, a contractor of Wyatt's confessed to him that
he had not placed the foundations of the tower according
to the specifications and that he was fearful the tower
would fall at any instant. Hastily warning Farquhar,
Beckford hoped the tower would at least stand for the
remainder of his life. His optimism was shattered.
Within that year, on December 21st at 3:00 P.M. the
tower fell to its destruction, crushing one of the
galleried wings and the Octagon and subsiding in the
fountain courtyard. [18]

The architectural significance of Fonthill Abbey was
obscured during the period immediately following its
diasppearance by the seriousness and moral intensity
of the subsequent Gothic Revival. Even prior to
this moral approach the villa was considered by many a
"meretricious piece of nonsense". [19] According to
Frankl the Gothic Revival entered its serious phase
with the Houses of Parliment; everything preceeding this
time, including Walpole's Strawberry Hill and Fonthill
Abbey had been "mere trifling and dilettantism". [20]
However, unlike his successors, Wyatt did not feel
compelled to engage in the exact reproduction of a med-
ieval building, but rather developed his own honest

successful adaptation. There being no recognized Gothic prototype for domestic architecture, many contemporary architects had only added occasional battlements and gothicized windows to the design of a house for a patron. But Wyatt turned to spiritual architecture not only for details, but also for scale and proportion: he imitated in Fonthill "the height, the towers, the vaults, and the scale of Cathedrals." [21]

With the development of the aesthetic concept of the picturesque and sublimity as an attribute of the picturesque, the concept of great height once again achieved prominence. The revival of the Gothic style was opportune in this respect, it intrinsically possessed potentially picturesque characteristics and because of its association with qualities of vastness it was ideally suited for expression of the sublime. The Gothic expression was not approached the same way it had been by medieval builders, as a highly sophisticated method of building in its regard to technical detail, instead it became a set of forms and ornament borrowed from Gothic secular and cathedral architecture that relied on an association with the Gothic to visualize romantic principles. The approach towards the Gothic idiom in both contexts is elucidated by the attention given to perfection of technical aspects by cathedral architects and the lack thereof by romanticists. The tower at Strasbourg was the result of a patient search by builders for a technically viable structure. The tower at Fonthill was an allusion to that search, but an imitation that lacked the technical consideration found in the original. Its propensity to fall was not the fault of the constructors or the materials as much as it was intrinsic to the design. Structure was merely a prop for scenography. The tower was not the extension of a city, but isolated in the English landscape, it was the

132

center of an enchanting picture, where it called attention only to itself and of course, its owner. At this time it was the villa that influenced the theory of architecture more than any other building type, a result of the attention lavished upon it by influential patrons. Newly enriched merchants and industrialists adopted it as a favorite type and it became one of the most powerful mediums for expressing the aspirations of the era. William Beckford's dream of a tower and his desire to possess his own observation platform for viewing the landscape, actually in this villa and garden relationship a lofty prominent belvedere, was transformed by means of a stage set to some semblance of reality. Though he claimed he sought privacy, erection of such an ostentatious structure was an expedient way to discourage seclusion. The private construction of a monumental tower may have been regarded as inappropriate, but because it was Gothic and it was an attractive element of a picturesque landscape, an essential component in two-dimensional representations, it became publicly acceptable and more: in its vastness, its sublimity and all of its artificiality it was the fulfillment of a romantic dream, not only for Beckford, but for Wyatt, artists, the public, the time.
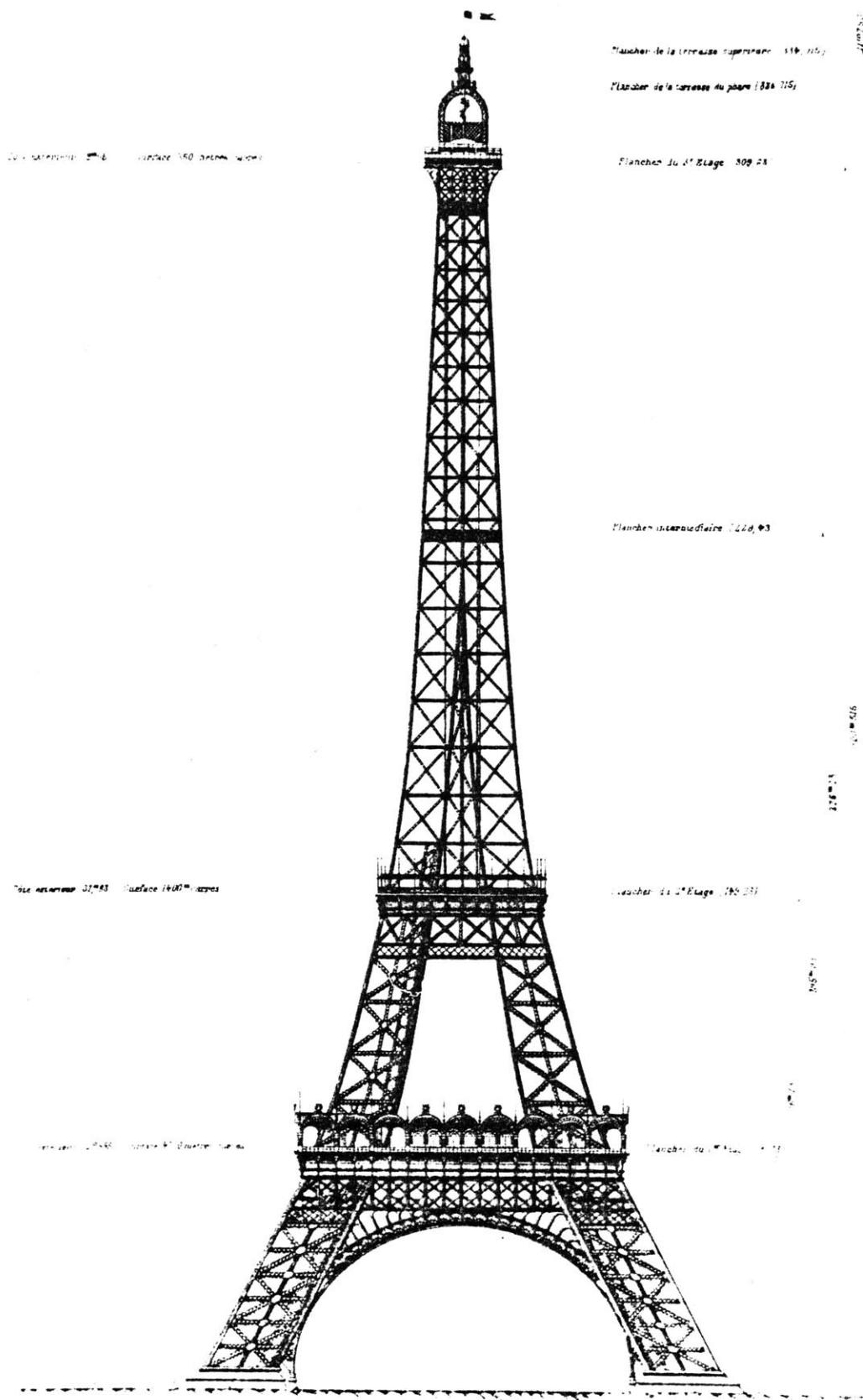
PARIS: EIFFEL TOWER

Although a somewhat tumultous and contradictory time
in France, the late nineteenth century Belle Epoque
was nevertheless as era where propitious economic con-
ditions combined with a respect for old values to
produce a spirit of confidence and optimism. The
temporary euphoria generated by this period was parti-
ally a result of its contrast with recent French exper-
iences of helplessness and military defeat. In the
Franco-Prussian War the Imperial Army of Napolean III
had been defeated in a matter of weeks. France had
lost the eastern provinces of Alsace and Lorraine, and
along with them the economic advantages of their mines
and industries. The Parisians themselves had suffered
most: they were the victims of a five-month siege by
German troops followed by civil strife where the city
was divided with barricades, ravished with fire, and
transformed into a tragic scene of bloody street fight-
ing that left it in ruins and 20,000 Parisians dead.
But in the course of a decade the city made an amazing
recovery and the economy gained momentum: the national
income doubled, industrial production tripled and
foreign trade increased by 75 percent. [1] France con-
quered a colonial empire in Indochina and North and
Central Africa in the 1880's. Second only to Great
Britain's in population and size, it provided a new
expanded market for investment and industrial output.
As the Republic became firmly established and gained
economic momentum, the government looked forward to

42. Eiffel Tower,
measured elevation

135

commemorating the centennial of the French Revolution
with a national industrial exhibition to be held in
1889. More than a commemoration, the centennial was to
be an effort by France to recapture lost glory and to
express a new industrial supremacy they believed they
had lost early in the nineteenth century to the British.[2]

The revolution that was initiated in Britain in the
late eighteenth century and guided by the liberating
thought of the Enlightenment was not effected by poli-
ticians, but by engineers. As the new profession
became established, monumental structures such as the
Crystal Palace and the Brooklyn Bridge were created,
their aesthetic based on the logic of mathmatical
equations. Works such as these had in common the use
of iron, a metal that had always been valued for its
hardness and strength, but had achieved a new potential
in the face of changing material conditions. Builders
were now able to take a new approach to structural
design based on a reasoned economical use of material,
rather than relying on the resolution of static forces
with sheer mass. Chicago's Home Insurance Building,
considered the first true skyscraper, was designed with
concealed iron framing by William Le Baron Jenney, a
Chicago architect who had graduated from the Ecole
Centrale des Arts et Manufactures in Paris one year
after his schoolmate, Gustave Eiffel. It was completed
in 1885, four years prior to the Eiffel Tower.

Hampered by governmental instability, plans for the
exhibition did not begin to take shape until 1886,
three years prior to the opening date. Edouard Lock-
roy, the new minister of commerce and industry, a
graduate of the Ecole des Beaux-Arts, a journalist and

an author of several comedies and operettas, believed
that the fair needed a "Babel-like symbol". He was
enamoured of the idea of a 1000-foot tower and promoted
it vigorously. The notion of a tower of this magnitude
was not especially new. At the close of the eighteenth
century architects had though of height in terms of the
sublime, as it was expressed in engravings of Wyatt's
tower at Fonthill. Anne Radcliff had asked, "Why is
it so sublime to stand at the foot of a dark tower and
look up its height to the sky and the stars?" [3] But
to the Victorian era, height was to suggest a different
idea: the new material conditions seemed to suggest an
engineering feat for its own sake, a symbol of optimism
and technical achievement, a tribute to the belief in
scientific progress. [4] The attitude of the nineteenth
century builders was illuminated by Ruskin:

> Whenever men have become skillful architects
> there has been a tendency in them to build
> high; not in any religious feeling, but in
> mere exuberance of spirit and power as they
> dance or sing.... [5]

With this spirit, in the early part of the century
designers set out to create a tower 1000 feet high.
The chosen height was arbitrary but significant because
it dwarfed towers of the past, for example the spires
of Gothic cathedrals. Once the problem was established,
architects and engineers worked at its resolution for
almost sixty years until the final achievement of the
Eiffel Tower.

The first project for the design of a 1000-foot tower
was for the purposes of commemorating the passing of
the Reform Bill in England, a measure that marked the
end of laissez-faire and the beginning of an era of

43. Richard Trevithick,
design for a 1000-
foot tower
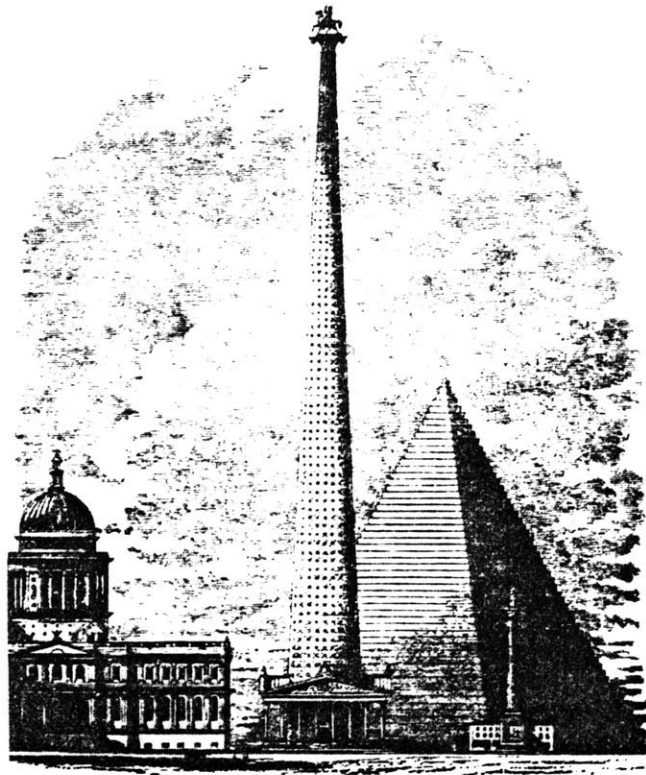
enthusiastic reform. Richard Trevithick, an engineer
eager to re-establish himself in England after his
absence to investigate some Peruvian silver mines, was
chosen as designer for the project. A lithograph of
the project was published in 1832. A conical tower
entirely of cast iron was proposed: the plan diameter
was 100 feet at the base, tapered to 10 feet at the summit.
A cylinder 10 feet in diameter at the center accomodated
an innovative lift for persons ascending to the top.
The gigantic column aroused the interest of the King,
but two months later Trevithick died and with him
interest in the project. The form of the tower, con-
sidered unusual at the time, and the political connota-
tions it carried may have been partially why interest
waned, but the chief factor was probably uncertainty
of its structural feasibility. Trevithick's reference
to a circular stone foundation six feet wide showed
that the engineer was not fully aware of the implica-
tions of a 6000-ton gravity load or of the great over-

44. C. Burton, design for a 1000-foot tower
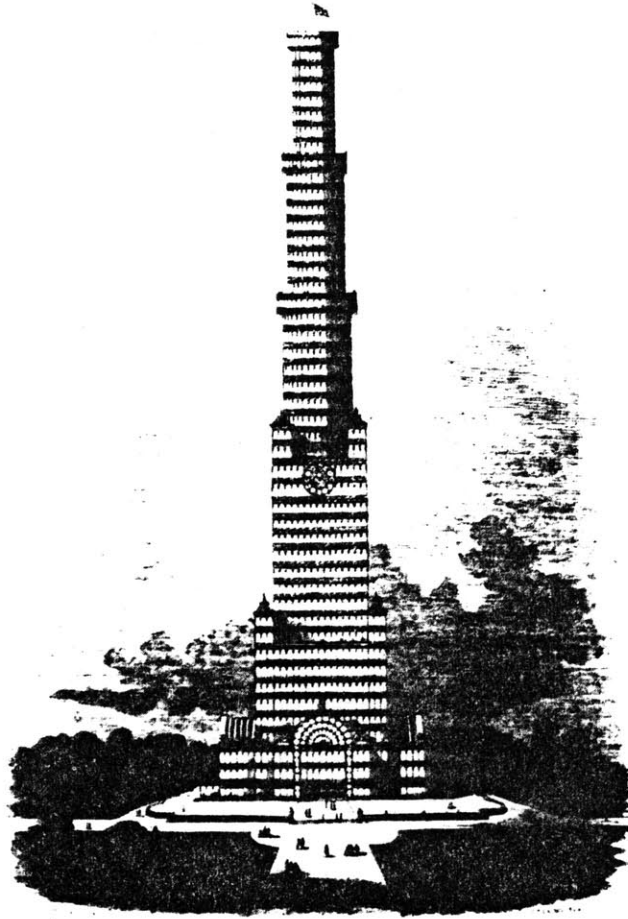
turning moment generated by wind on a 100-foot high tower. The project does indicate the spirit of the structural pioneers however: the vision of a glorious golden tower rising in smoke and mist-filled London to a height three times that of St. Paul's cathedral was a heroic one that could be achieved for the time only in the nineteenth century. [6]

Nineteen years later, the Great Exhibition provided another opportunity for the expression of Victorian exuberance in the Crystal Palace. When the Exhibition closed, the question as to what would be the best method for disposing of the glass and iron building was seriously debated. The Builder magazine accepted proposals for the future of the structure. Among these was a 1000-foot tower proposed by the architect C. Burton made from iron and glass salvaged from the exhibition

139

building. The tower actually consisted of a series of towers telescoped within one another; each tower functioned independently structurally, its iron framework directly transferred loads to the foundations. The tower was to support a clock 44 feet in diameter, 440 feet above the ground. Burton emphasized the view from the top of the tower: one would be able to survey the countryside for one hundred miles around London without the risk involved in a balloon ascent. [7]

In the 1970's when the United States was preparing to celebrate its first century of independence, young designers became preoccupied with the idea of a monument to signify the achievements of the young republic. One of the most spectacular designs was submitted by Clarke and Reeves who, just as Trevithick and Burton before them, presented a proposal for a tower 1000 feet high. The cylindrical structure was 150 feet in diameter at the base and 30 feet in diameter at the top. A spiral staircase wound around a central cylindrical shaft containing four elevators that had the capacity to ascend to the top of the tower in three minutes and descend in five minutes, transporting 500 passengers per hour. Extremely conscious of the problem of wind-loading, the designers reduced the load-bearing surface of the tower to a minimum through the use of the proprietary Phoenix Column, a hollow tube section made up of segmental sections bolted through projecting flanges, and with diagonal bracing made of iron tubes of a smaller section. Intended for a site adjoining the Centennial Exposition in Philadelphia in 1876, it was proposed that the Exposition be brilliantly illuminated at night by calcium and electric lights from the tower. Enthusiasm for the tower was expressed in an article in Scientific American:

140

45. Clark and Reeves, design for a 1000-foot tower
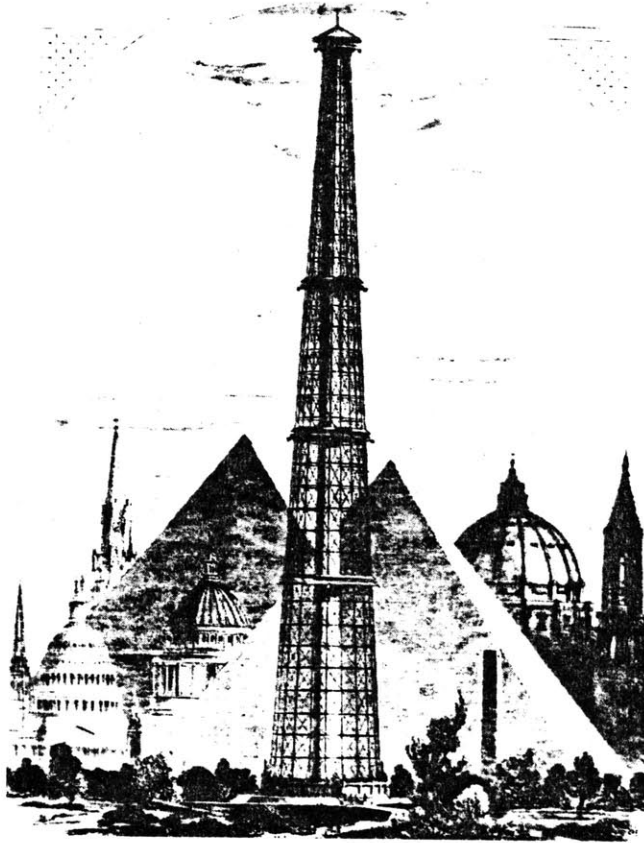
... to its prototype, Babel, a pile of sundried clay... the graceful shaft of metal, rearing its summit a thousand feet above the ground, forms a fitting contrast, typical of the knowledge and skill which intervening ages have taught mankind. [8]

Unlike the previous designs for a 1000-foot high tower, the Philadelphia tower displayed a complete disregard for contemporary architectural theory. Even Trevithick's tower alluded to a classical column with its divisions of base, shaft, and capital. Clarke and Reeves were concerned only with structure and its direct, logical expression. [9]

By the time of the centennial of the French Revolution, Eiffel had already produced such displays of structural daring as the Garabit viaduct, where he had evolved his own workable formula for wrought-iron construction.

141

He had developed a design for high support towers in which the tower widths spayed at their bases to resist wind and had experimented with new metal forms made of factory produced pieces. By significantly reducing trusswork without sacrificing strength and rigidity he was able to create sturdy, light, and most importantly, wind-resistant structures. Additionaly he had developed novel erection procedures, such as his method for "launching" the deck of a bridge using a system of rollers and rockers that evenly supported the bridge deck as it was thrust forward over a chasm to meet the next pier. Eiffel's preference for wrought iron, his careful attention to bracing the structure against the wind and his development of new erection methods were found in evolved form in his design for a 1000-foot tower, his final and greatest metal construction.

Eiffel's suggestion for the exhibition tower was enthusiastically endorsed by the French government and a special commission was formed to examine the technical feasibility of the project. At the time a competition was established and other designs were submitted; however at a second meeting the commission announced that the Exhibition tower should be a masterpiece of the metallic industry and furthermore, Eiffel's tower appeared to be the only entry that fulfilled this condition. The competition criteria had actually been designed specifically with Eiffel's project in mind. It had been on paper since 1884 when it was outlined in a French civil engineering review. Shortly afterwards Eiffel had called on Lockroy, presenting the idea of the tower as a centerpiece for the Exposition of 1889. He emphasized that stone had already been pushed to the limit of its technology in previous eras and

that new ambitions called for new materials and techniques previously unavailable. At the time the world's tallest structure was the 555 foot high Washington monument, only 43 feet higher than the spire of the Cathedral of Cologne. [10]

Over 100 projects were submitted for the competition. Among the rejected ideas were: a tower in the form of a gigantic sprinkler to water Paris in case of drought; an immense guillotine symbolizing the Revolution; a tower with a powerful electric light at its summit surrounded with a system of parabolic mirrors that reflected light towards the most remote quarters of the city; and the "Tour Soleil", crowned at the top with a 180-foot allegorical statue representing science, and containing six levels with fifteen rooms each for "aerotherapy" treatments, a multistory basement museum dedicated to electricity and a hollow center shaft to accommodate scientific experiments involving falling objects. [11]

The ground breaking for the Eiffel Tower took place in January, 1887. Within five months the workers had completed the masonry and iron foundations that rested on a layer of sand and gravel over a deep stratum of clay. Hydraulic presses were added at the angles of the piers to enable manipulation of the structure and insertion of iron wedges between the pier and foundation, accommodating any settlement that would occur when the full load of the tower was applied. When the four angled legs reached 100 feet, scaffolding was necessary to carry their construction to a height of 169 feet where they were to be joined by the horizontal beams that formed the first platform. Prior to constructing the platform, as if adjusting a gigantic

precision instrument, Eiffel brought the sixteen
columns of the four piers into line while correcting
their position through the manipulation of the hydraulic
presses. The first platform was completed in April,
1888. Within three months the second platform was
constructed at 250 feet. At this point in the building
process there were some feelings of doubt on the part
of Parisians generated by a Professor of Mathmatics
who claimed that the Tower was at a height that was
its theoretical maximum and if taken any higher it
would collapse. [12] But such theoretical propositions
did not slow construction. As the Tower reached about
two thirds of its completed height, dissatisfaction
among the workers grew: the work had been arduous, a
source of discomfort, and threatened with danger.
Besides the ever present fear of falling, although
vertigo was virtually eliminated through the construc-
tion of opaque wooden platforms, the hazards of outdoor
construction work, magnified by the open design of the
tower were a constant source of frustration as workers'
hands froze to metal and rivets cooled before they
could be driven. Despite strikes, bargaining, and
replacement of workers, construction progressed nearly
on schedule. [13] Throughout the fabrication process,
pieces of iron were raised by four cranes attached to
tracks within each pier that were to be later used by
the Tower's elevators. As the cranes made the climb
towards the top of the Tower during progressive stages
of completion of the structure, they periodically
jumped up their tracks from an inclined position in
the lower part of the Tower to a vertical position
formed by the central elevator guide in the upper
portion of the Tower. Despite the lack of elevators,
their late arrival resulting from conflict between

144

Eiffel and the elevator companies over issues of aesthetics and safety, the official inauguration of the Tower took place one day after construction completion on March 31, 1889 when Eiffel himself climbed the tower and unfurled the French tricolor on an iron mast.

The outline of the Tower was desigend to resist the wind according to Eiffel's structural philosophy that the essential lines of a building should be suited to its purpose. Built of iron because Eiffel did not trust steel, it has a high strength to weight ratio and was therefore extremely light. However, it did present a relatively large surface to wind at great heights and for this reason its vertical dead load was very small in comparison to the horizontal wind load. Consequently, the Tower was designed parabolically with a wide base, as a very efficient cantilever. Viewed as a unified fabricated form, the whole Tower was an adaptation of "the lofty supports of iron bridges increased to cosmic dimensions."[14] Its daring presence not only results from its height but also from its wilderness origin; not inspired by the architectural conventions of the time, its aesthetic instead originated in railroad supports which Eiffel himself had constructed in regions remote from the Parisian landscape.

The Tower rises in three stages to its full height. Its four great piers embrace an immense internal space as they asymptotically meet at the summit. The arches that connect the four supports are purely decorative; though reminiscent of Eiffel's original intention of supporting the tower on gigantic bridge arches, they

145

carry no load at all, perhaps a gesture on Eiffel's part to a public who would feel more convinced of the stability of a structure seemingly supported by a conventional arched form rather than one resting only on curved pylons. Elevators rise along the east and west piers to the first platform, along the north and south piers to the second platform with one elevator stopping at an intermediate point, and from the second platform a double elevator ascends the center of the Tower to the third platform. Considering the elegance and economy of the structure, the system of internal transportation appears cumbersome. However, the most straightforward solution would necessitate elevators rising from the ground vertically through the center of the Tower disrupting the simplicity and clarity of the structural expression. [15]

Most of the interior construction that was separate from the iron structure was placed on the first level of the Tower where a majority of the visitors were expected to stop. The platform was open in the middle creating a rectangular promenade 930 feet long and nine feet wide sheltered by iron arcades. Here the public could partake in a panoramic view while lesiurely walking, shopping, or eating in one of four restaurants. The second level contained an editorial room with a printing press for producing a daily Exposition guide, a bar and a pastry shop. From the glass enclosed octagonal third platform, a spiral staircase led to an upper level apartment with adjacent labs for Eiffel's scientific experiments. On a balcony surrounding the platform tracks were placed to carry two high-powered spotlights that could be focused on

46. Paris, Eiffel Tower

147

148
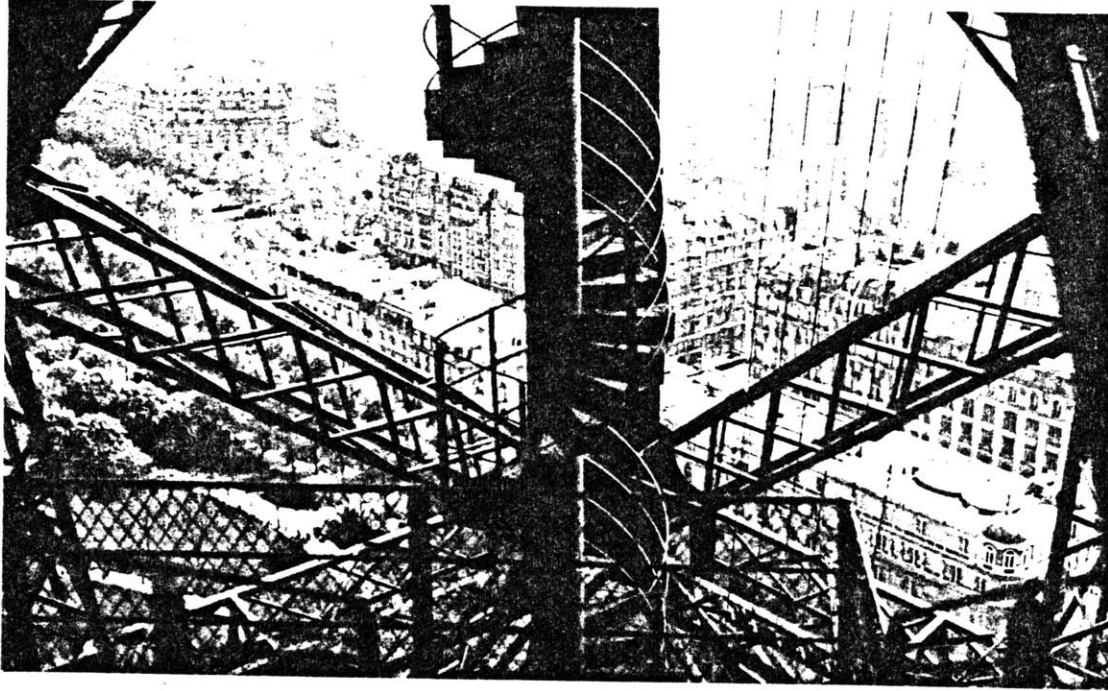
48. Eiffel Tower,
    view from interior

different monuments in the city within a seven mile
range for the pleasure of the observers in the Tower.
A beacon was placed at the summit with a range of 120
miles, visible from Chartes cathedral. Painted in a
reddish brown color called Barbados Bronze, the struc-
ture was deep-toned on the lower piers and progressively
lightened until it was almost pale yellow at the top,
accentuating its appearance of loftiness.

Although the Tower presents the single, unified image
of an open metal cantilever, the strength of this exp-
ression depends on the synthesis of almost an infinite
number of standardized iron components. The intricacy
of construction detail reflects the economic conditions
of nineteenth century France where field labor was
less costly than shop metal. [16] The height of the

47. Robert Delauney,
    Eiffel Tower,
    1910

tower infuses it with a monumentality that is contra-
dicted in its transparency. Its outer and inner
spaces are interpenetrating to an extent that goes
beyond Gothic achievements in stone, such as the

149

cathedral spire at Strasbourg. Internal descent

through the open cantilever provides not only views of
the distant complexity of the Parisian cityscape, but
close up intimate views of the riveted detail in the
structure of the tower, an internal park-like setting
that competes with the external vistas. [17] This juxta-
position led Sigfried Giedion to observe the way the
"soaring lines of structure intersect with trees,
houses, churches and the serpentine windings of the
Seine" and that the "interpenetration of continuously
changing view points creates, in the eyes of the
moving spectator, a glimpse into a four-dimensional
experience." However, this interpretation of the tower
was not truly revealed until two decades after its
completion when "an optical revolution shattered the
static view point of the Renaissance." [18] Giedion
believed that the essence of space as conceived by
modernists was its many-sidedness and that the dis-
covery of the "fourth dimension", or space-time,
enabled one to see the world in a new way. The notion
of the fourth dimension enabled such artists as
cubist painter Robert Delaunay to depict his surround-
ings from a new viewpoint. Haunted by the Tower, his
visions of it corresponded to his own artistic devel-
opment. No artistic formula could express the multi-
faceted spatial character of the Tower, so he searched
beyond the laws of realism and perspective to develop
his own interpretation, embracing its many dimensions.

Believing they had been surpassed by the British in
the early nineteenth century, France hoped to demon-
strate its new economic and industrial vigor through
the exhibition. Eiffel believed the Tower would "show
the world that France contines to be at the forefront
in the art of metal structures." [19] It was perhaps

150
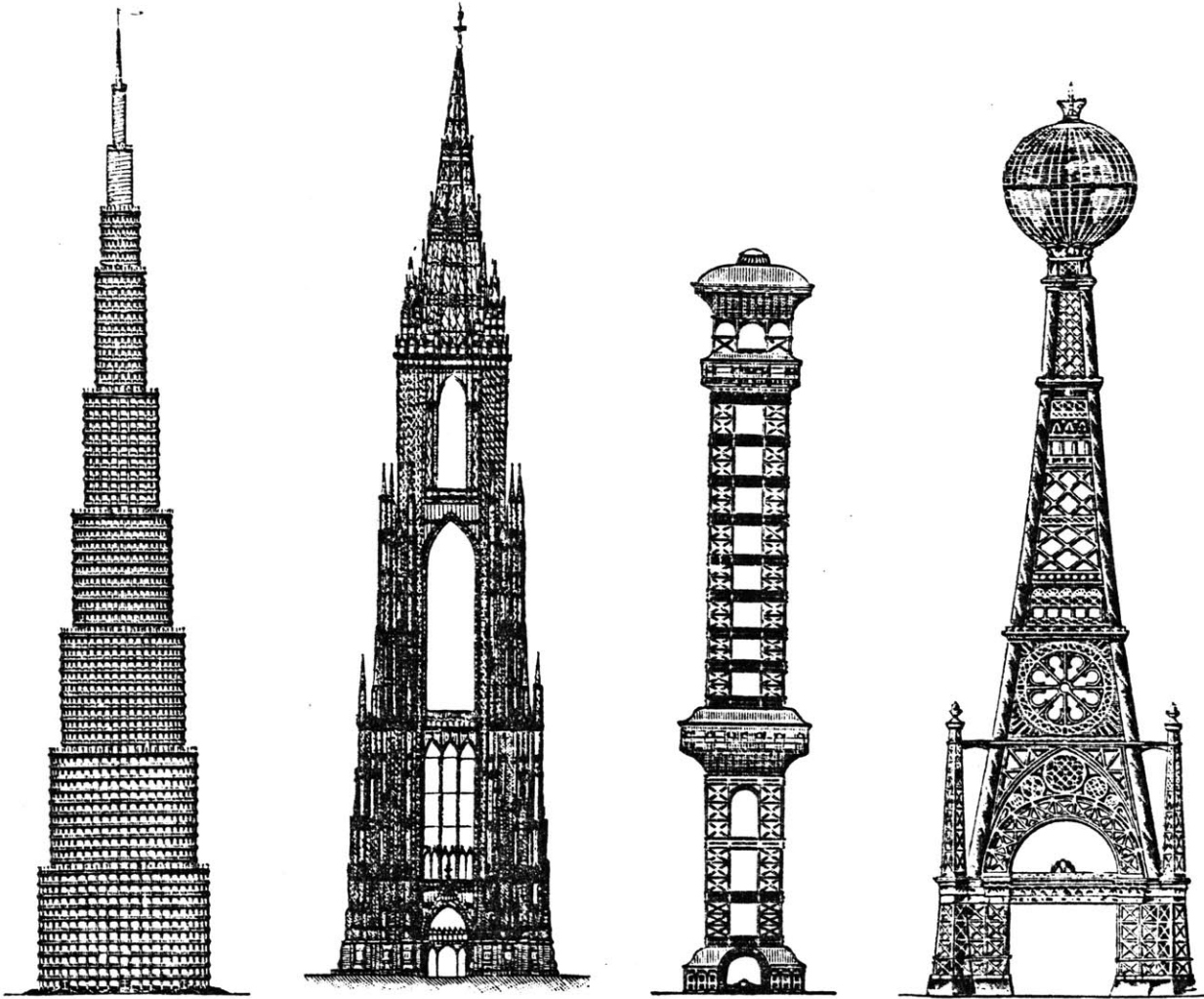
49. London, competition entries for the design of a 1200-foot Tower

partially the competitive spirit that existed between the two countries that led financial speculators in London, under the title of the Tower Company Limited, to sponsor a competition for a 1200-foot high Tower for London. According to the prospectus:

The Eiffel Tower has already rendered valuable service to science, besides affording special opportunities for observation and research, which, owing to its altitudes are not otherwise attainable. Taking into consideration the enormous popularity of the Eiffel Tower and the consequent pecuniary benefits conferred on those interested in that undertaking, it is not too much to anticipate that, in the course of a short time, every country will possess its tall Tower.

151

50. London, competi-
tion for the
design of a 1200-
foot Tower, towers
awarded first and
second prize
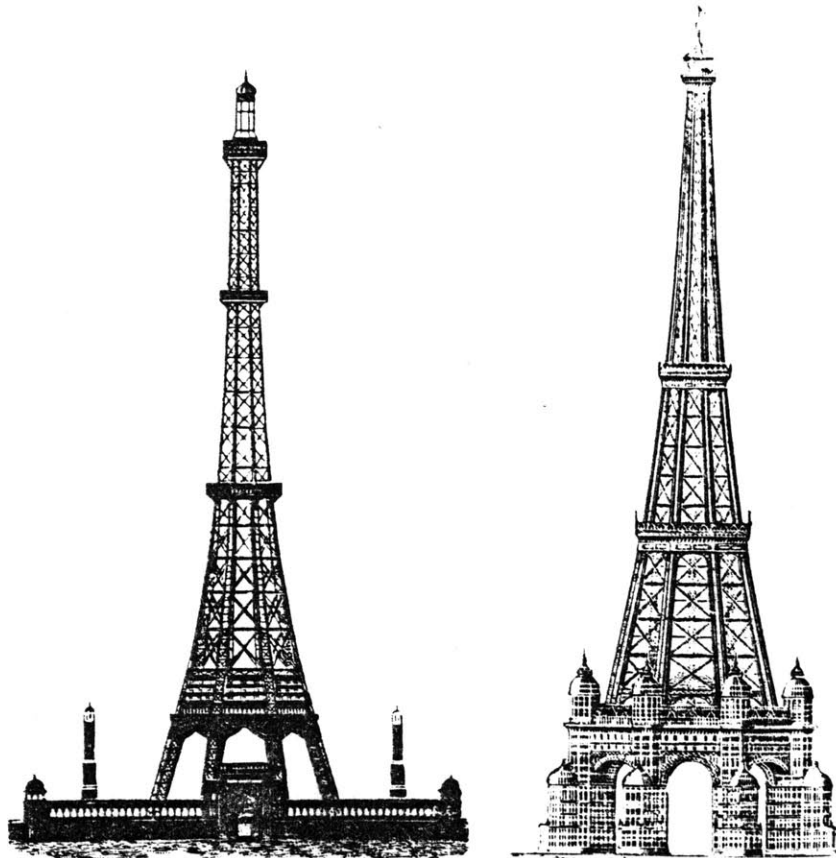
It is proposed that the Tower shall
be much more spacious and of greater
altitude than the Eiffel Tower....
Special facilities for pleasure seekers
will be provide, such as Restaurants,
Theatre, Shops, Turkish Baths, Promenades,
Winter Gardens, and a variety of other
amusements, which will not only afford
healthful recreation for the millions, but
it is anticipated, will ensure a profit-
able return for the shareholders... [20]

The conditions of the competition were simple and brief.
The only important stipulations were that steel was
the preferred material, that elevators must be provided,
and that the designs were to be accompanied with
construction estimates. The sixty-eight designs
submitted ranged from orthodox designs resembling
Eiffel's Tower to more eccentric approaches that exag-
gerated a particular stylistic tendency or utilized

152

period motifs at a gigantic scale. The jury emphasized practicability and construction cost over the potential structural brilliance of some of the unconventional designs and gave prizes to two designs that resembled the Eiffel Tower. Construction on the tower actually began in Wembly Park, near London in June 1893, but seven months later when the structure reached the level of the Eiffel Tower's first platform, the project was halted temporarily and eventually abandoned. As a group the designs displayed an adventurous spirit free of inhibition. Unlike Eiffel's approach where the aesthetics of the tower were primarily the result of scientific analysis, the English towers were based on a preconceived notion of what the tower should look like: engineering was only considered a means by which an exotic design could be made to stand. [21]

Before the construction of the Eiffel Tower began, a number of people became angry with the proposed project. The technical feasibility of the Tower was beyond the understanding of most Parisians, but its potential effect on the skyline was not, especially for the group of artists and writers who made their famous public protest:

> We writers, painters, sculptors and
> architects, fervent lovers of the beauties
> of Paris, hitherto unblemished, protest
> with all our might in the name of slighted
> French taste against the erection, in the
> height of our capital, of the useless and
> monstrous Eiffel Tower, which public ill-
> feeling, often inspired by good sense and
> the spirit of justice, has already christ-
> ened the Tower of Babel. Shall the city
> of Paris associate itself with the grotes-
> que, the commercial fantasies of a building
> (or a builder) of machines, to dishounour
> itself and disfigure itself irredeemably?
> For the Eiffel Tower, which not even trade-

conscious America would wish to call its
own, is the dishonour of Paris, do not
doubt it.... [22]

However when the Tower was completed many, though cer-
tainly not all, of the initially adverse opinions
were transformed into favorable, accomodating views.

Shortly after its construction, Eiffel utilized the
Tower as a laboratory for several kinds of experiments.
His uncertainty of the future of the Tower, knowing
that his 20-year lease would eventually expire, led
him to establish more firmly its utilitarian role.
He installed weather equipment on the third platform.
Physiological tests were conducted on the top of the
Tower to determine the effects of altitude on the
human organism. Interested in experimentation and
research in aviation, Eiffel conducted drop tests from
the top of the Tower and built a wind tunnel at its
base. He also knew that the Tower was a natural
communications post and encouraged experiments in
transmission.

The Tower survived Hitler's threat to reduce it to
a pile of ruins along with other Parisian monuments
during the second World War; afterwards it returned
to its original status as the leading tourist site in
Paris and one of the most visited monuments in the
world. In 1925, the Tower was converted into one of
the largest advertising displays ever constructed
when André Citroën rented space on it to advertise his
automobiles. The Citroën logo and animated figures
lit up the sky in five-second flashes until 1936 when
the sign was removed. The Tower has at times been a
"lightning rod" for a variety of erratic human impulses:

154

in 1909 Comte de Lambert flew over the top of the
Tower in a biplane, many have climbed the Tower as if
it were an iron mountain, and as one might expect, it
has been the site of numerous death leaps.

Prior to the construction of the 1046-foot Crysler
Building in New York in 1929, followed by the const-
ruction of the 1250-foot Empire State Building two
years later, the Eiffel Tower was the tallest man-made
tower in the world. Since that time commercial struc-
tures over 1000 feet high have become more common. In
Paris, where a new vertical element on the skyline
provoked intense debate a century ago, it is now being
encroached upon by a series of dull utilitarian high-
rise structures. But the Eiffel Tower remains the
tallest tower not built for a specific commercial or
practical purpose. Attempts to capture the powerful
imagery of the Tower have materialized in the form of
a design for a 2060-foot steel tower for the World's
Fair in Chicago in 1932 that was never realized, in
the St. Louis Gateway Arch and in replicas such as the
340-foot tower built in King's Mill, Ohio as part of
an amusement park in 1972.   Replicas are sold at a
miniature scale, accessible and touchable for everyone
in the form of tower trinkets. The desire for a relic
or replica of the Eiffel Tower has reached the propor-
tions of fetishism. In several instances, people have
requested dimensions of the Tower specifically for the
purpose of personally reproducing it by any available
means at hand. [23]

In a recent examination of the Tower at a vantage
point removed in time from the initial study and inter-
pretation of it by early artists, careful observers

155

such as Roland Barthes have discovered it to be a
rich source of meaning that has accrued with time.
Barthes believes the Tower has attracted meaning be-
cause of its omnipresence:

> ... wherever you are in the landscape of
> roofs domes or branches separating you
> from it, the Tower is there; incorporated
> into daily life until you can no longer
> grant it any specific attribute, deter-
> mined merely to persist, like a rock or
> the river, it is as literal as a pheno-
> menon of nature whose meaning can be
> questioned to infinity but whose existence
> is incontestable. There is virtually no
> Parisian glance it fails to touch at some
> time of day.... This radiant position
> in the order of perception gives it a
> prodigious propensity to meaning: the
> Tower attracts meaning, the way a light-
> ening rod attracts thunderbolts; for
> all lovers of signification, it plays a
> glamorous part, that of a pure signifier,
> i.e., of a form in which men unceasingly
> put meaning... [24]

To have achieved this level of importance for humanity,
it always must be more than the Eiffel Tower. And
though it seems paradoxical, it must additionally lack
a function:

> ... the Tower must escape reason. The first
> condition of this victorious flight is that
> the Tower must be an utterly useless monument...
> Gustave Eiffel, in his own defense of his
> project in reply to the Artists' Petition,
> scrupulously lists all the future uses of the
> Tower: they are all, as we might expect of
> an engineer, scientific uses: aerodynamic
> measurements, studies of the resistance of
> substances, physiology of the climber, radio-
> electric research, problems of telecommunication,

156

meterological observations, etc. These are
doubtless incontestable, but they seem quite
ridiculous alongside the overwhelming myth
of the Tower....[25]

For Barthes, architecture is always a combination of
dream and function. Nineteenth century builders
dreamed of structures of an astonishing height, much
in the same way the earliest builders had:

> Hence we might speak, among men, of a true
> Babel complex: Babel was supposed to serve
> to communicate with God, and yet Babel is a
> dream which touches much greater depths than
> that of a theological project; and just as
> this great ascensional dream, released from
> its utilitarian prop, is finally what remains
> in the countless Babels represented by the
> painters, as if the function of art were to
> reveal the profound uselessness of objects,
> just so the Tower....[26]

Yet this "empty monument" receives more visitors than
any other location in Paris. It is a world in itself,
an object to be explored, to be possessed.

> ... the Tower ultimately reunites with the
> essential function of all major human sites,
> autarchy; the Tower can live on itself: one
> can dream there, eat there, observe there,
> understand there, marvel there, shop there,
> as on an ocean liner (another mythic
> object that sets children dreaming), one
> can feel oneself cut off from the world
> and yet owner of a world. [27]

The Eiffel Tower represented a momentous transition in
the concept of the tower as understood in its aggrega-
tion of past representations. Presented as a material
of newly discovered potential, iron was now fabricated
157 in an innumerable set of pieces to be bolted and

connected. The elevator found one of its earliest
and most widely recognized installations. Actually
an assembly process, the construction procedure was
unprecedented in its speed, yet raised unparalleled
problems for workers, primarily resulting from new
conditions created by exceptional height. The open-
ess and transparency of the Tower anticipated concepts
of spatial perception to be fully realized, discussed
and debated by modernists. In its synthesis of a
combination of such major developments, the Tower was
truly unconventional, of which Eiffel was not unaware;
delicate art nouveau decoration and broad arches at
the base gave an appearance of refinement and "stability"
to the structure that facilitated public acceptance.
In their awareness of history, in their recognition
of their own technical accomplishments and of the dif-
ference of their age from any other, through their
arbitrary goal of designing a 1000-foot tower, nine-
teenth century engineers were in some respects competing
with the past in their search for an expression, an
achievement of their own. The French challenged the
rest of the world, especially England, who in their
attempt to outvie their rival almost constructed a
second Eiffel Tower. However in Paris the tower has
no competition, it unquestionably dominates the city,
as no tower has ever dominated a city. Paris cannot
be disengaged from the Tower, the assocation is a fixed
one that has become increasingly intimate with time.
Initially regarded as an exotic object grafted on the
Parisian landscape, it became a cynosure for technology
as well as for the city. In our present look towards
the past, it has yet to free itself from associations
with its creation, but it has also accumulated a wide
range of additional meanings; its susceptibility to

158

such varied interpretation, as Barthes indicates, lies
in its absolute "uselessness" as a monument, though
over the range of time it has been utilized in a number
of ways, simply because it exists and because it is so
obvious in its presence. It is high and it is located
in the center of Paris, a combination that helped it
become a popular tourist attraction. The belvedere had
never been so spectacular. The chaotic landscape,
the city, had never been enjoyed by so many, had never
been embraced in one sweeping, all-encompassing view.
A climbable structure, touchable, it was the machine,
confiscated from its display stand in the exhibition,
externalized, blown to a gigantic scale, yet affable,
urbane. Constructed as a symbol of nineteenth century
transcendentalism and optimism, in the spirit of scien-
tific achievement, the anticipation of a better world, it
gloriously wore these ideals on the face of the Parisian
landscape. But today such ideals are history; the
tower has not become completely disassociated with them,
but rather, as Barthes elucidates, has now become an
empty receptacle into which we place a variety of mean-
ings; their hierarchy varies with its interpretations
among individuals from near or far, from the past or
the present. Any certitude of its meaning lies simply
in its continuity as a powerful image across an entire
range of assumptions, interpretations, speculations.
It is this attribute of adaptability that gives it the
potential to come closer than many towers in represen-
ting the idealized conception of "tower".

159
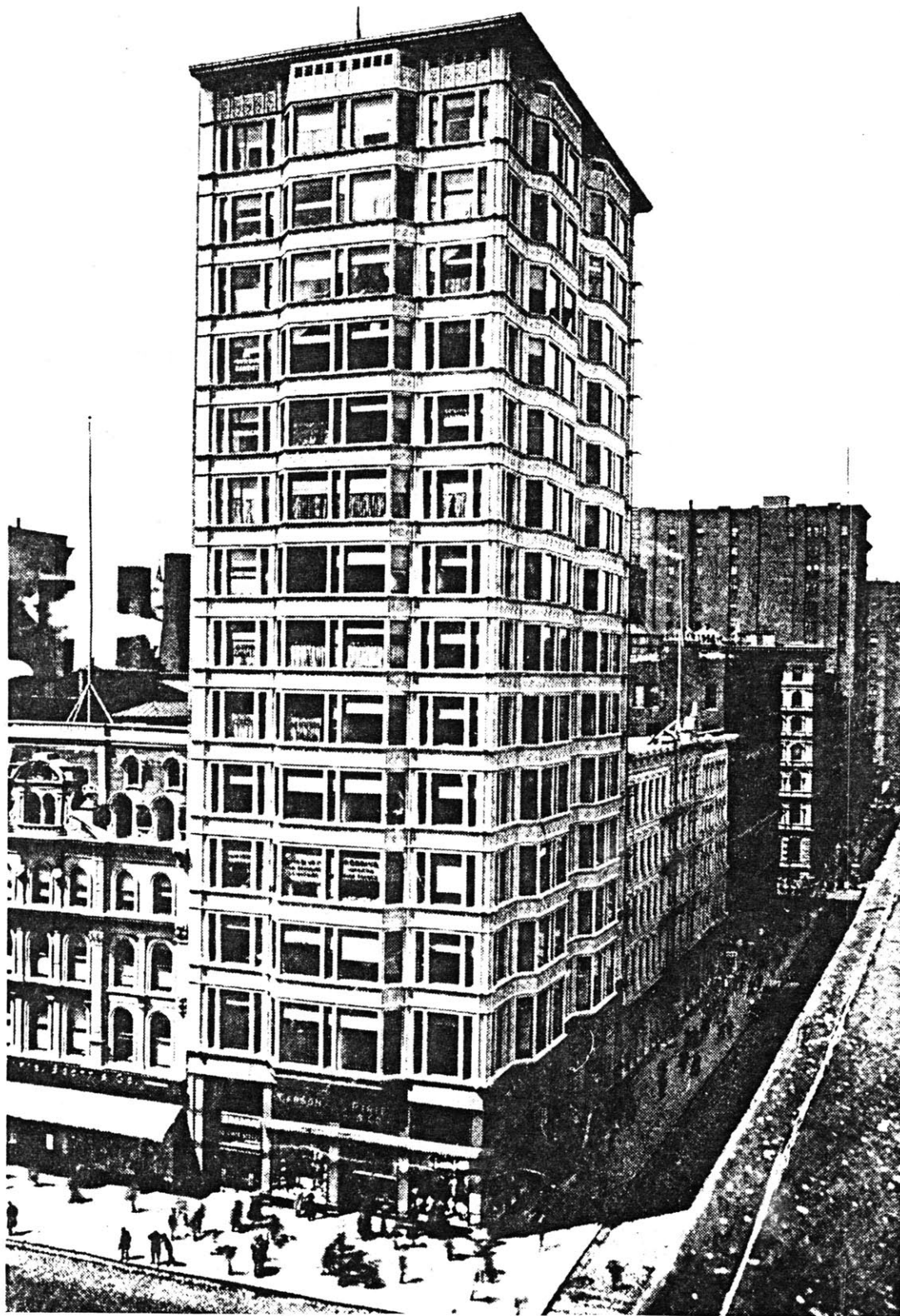
CHICAGO: THE RELIANCE BUILDING

Prior to the fire that almost completely destroyed the
city in 1871, Chicago was already a town of 300,000
inhabitants that was rapidly becoming a metropolis, a
growth process facilitated by its nodal position in the
emerging railraod network and the agricultural regions
of the Midwest. It was a place without a deep history,
a well travelled crossroads for people and goods, and a
center for processing agricultural produce from Mid-
western farms prior to its shipment to the populous
East. After the fire, rebuilding was slow at first
because of fear of further disasters, but construction
was intense in the last two decades of the nineteenth
century and what had been a village atmosphere was
suddenly transformed into a modern business community
with offices, warehouses, shops and hotels. Corporate
enterprise as it is known today had been initiated and
was rapidly expanding. To meet new needs generated by
accelerated business growth, innovative building
approaches were tested with an unusual boldness.

The new building methods grew out of specific tech-
nical developments. William LeBaron Jenney perfected
the steel skeleton in his Home Insurance Building in
1885. For the first time, the metal framing supported
all the building loads, including the outer masonry
walls, demonstrating that it was possible to increase
building height without placing an excessive load on
the lower piers while also providing a less enclosed
floor plan and larger expanses of glass, improving

51. Chicago, the
    Reliance Building

161

interior illumination. In 1872, F. Baumann began suggesting new systems of piers to support concentrated building loads and he gradually developed and perfected them until he achieved the resulting "Chicago caisson" in 1894. The first safe steam lift was installed by E.G. Otis in New York in 1857 and appeared in Chicago in 1864. The hydraulic lift was developed by 1870, followed in 1887 by the electric lift. Innovations such as these, in addition to the widespread use of the telephone, made possible the agglomeration of office spaces in almost any quantity desired. The understanding of these technical developments on the part of architects, along with the absence of the restricting tradition of eastern cities, the lack of any pre-existing physical setting resulting from the fire and most importantly, the advanced degree of economic development, all contributed to the favorable climate for innovation that existed in Chicago in the 1880's.

The great increase in the height of Chicago buildings was primarily achieved in office buildings though these buildings often incorporated other commercial and even institutional uses. In this development, the new building technologies actually played a lesser role in relationship to the paramount factor of economics. Office space became a commodity to be sold at a profit. Technological experimentation was actually financed by business.[1] According to Louis Sullivan, it was the local sales managers of Eastern rollings mills who were in reality responsible for the concept of the steel frame. The activity generated by the construction of the tall masonry load-bearing structures attracted their attention and from this point on the development of the frame was a matter of skillful salesmanship of

an engineered product.[2] Height also had the economic
advantage of prestige value for the business firm. It
was useful in public relations: through advertising the
name of the company it inspired confidence in its
product, virtue was automatically attributed to the
organization that owned a lofty building and, in
general, height symbolized position, power and pros-
perity.[3]

The Reliance Building is probably Chicago's finest
skyscraper.[4] According to Giedion the "experience of
the Chicago school is summed up in this glass tower."[5]
It was originally built by Burnham and Root in 1890
as a five-story building and later, in 1895, after
Root's death, an architect on Burnham's staff, Charles
B. Atwood, and the engineer E.C. Shankland added an
additional ten floors identical to the floors const-
ructed initially. The upper steel frame was erected
in fifteen days. It was innovative in its inclusion
of two unusual provisions for windbracing: first, the
24 inch deep spandrel girders with either solid or
trussed webs were bolted through their entire web
depth to the columns forming a rigid connection;
second, the two-story length columns were vertically
staggered in their relationship to one another incre-
asing lateral stability. The exterior envelope, a
vertical succession of dark bands of glass divided into
large panes with slender mullions, transparently
wraps the internal piers and columns. Reflected in
the horizontality of the spandrel panels, the floor
system of the interior is supported by a framing
system of steel girders and joists that transfer the
loads to the columns. In the lack of expression on the
facade of the underlying structure and in the simplicity

163

and clarity of its surface, Atwood came very close to
succeeding in the development of the modern curtain
wall. The skin achieves its lightweight dematerialized
appearance not only from the extremely high proportion
of glass, but also from the careful detailing that
places the glass contiguously in the same plane with
the white terra cotta spandrels. The windows are one
of the most significant features of the building because
they represent the highest development of the "Chicago
window", or the placement of a pane of glass so that it
fills an entire structural bay with the exception of
smaller adjacent panes to each side containing a narrow
operable sash. The bow window had originally appeared
in early Chicago buildings as a separate component that
lacked integration in the overall design scheme, but
here it was made an integral part of the building skin.
In its continuity with other windows of its type it
formed an undulating facade. Rather than a heavy over-
bearing cornice, the roof is a thin projecting slab
that suits the character of the delicate transparency
of the facade. In its lightness, airiness, in the
purity of its proportions and in its cogent declaration
of structural utility as art, more than other nineteenth
century building the Reliance Building anticipated the
development of the twentieth century modern office
building. [6]

For Leonardo Benevelo, the importance of the Reliance
Building to the observer of modern architecture can be ex-
plained by the construction process that led to the sur-
prisingly cohesive tower expression. The later hasty
addition of the upper ten floors indicates that the build-
ing was not designed as a whole, but as a multiplication of
units. The simple motif consisting of decorative strips of

164

glazed white tiles and glass was simply repeated thir-
teen times above the two level base. He believes that
this process provides convincing evidence of the cul-
tural conflict underlying the experiments of the Chicago
school. The architects of Chicago were aware of the
potential for the development of a new building type
and wanted to master it architecturally, however they
only had the limited means available in their local
culture to achieve such an aim. The results we find
so important today, exemplified in the Reliance Build-
ing, were obtained just at the time when the concern
for the intricacies of composition was undermined in
the face of urgency. [7]

Montgomery Schuyler, a New York journalist and archi-
tectural critic, began writing a series of articles
after a visit to Chicago in the early 1890's that have
been grouped under the heading, "Skyscrapers: Ration-
alistic Architecture." He later became known as "one
of the most devoted apologists of the Chicago school."[8]
His evaluation of the Reliance Building was presented
in an essay on D.H. Burnham:

> Its most obvious peculiarity is that the
> protecting envelope is of glazed white
> terra cotta. Practically this is a very
> eligible material in the atmosphere of
> Chicago but the employment of it throughout
> seems almost like the frank abandonment of
> architecture, as much as the omission of
> an attempt to "do something" with the cage....
> The covering is confessedly a covering and
> does not in the least simulate a structure
> nor dissemble the real structure.... If he
> says, as he seems to say, that this is the
> actual skyscraper, the thing itself, and
> that any attempt to do more than he has
> done is to deny the essential conditions of
> the problem, it must be owned that he has a
> good deal to say for himself.... But on the

165

other hand, it must be owned that if this
is the most and best that can be done with
the sky-scraper, the sky-scraper is archi-
tecturally intractable... [9]

Schuyler's criticism weighted architecture in reference
to the milieu in which it was formed: if the conditions
were not ideal, the architectural expression was not
expected to be. In this respect, the skyscraper for
him would never achieve its ideal expression, it would
remain only an ambivalent one in its compromise with
the overriding concerns:

Modern commercial architecture in general,
when it is done by artistic designers, is
such a compromise. It bears the scars of
conflict, if not between the architect and
client, between the claims of utility and
of art or I should prefer to say between
the facts of the case and the notions of
the architect. [10]

However, Schuyler assumed that it was only conditions
such as those that existed in Chicago that had the
potency to produce a new architecture, if only success-
ful in the sense that it was innovative:

And, indeed, it would be worse than idle
to find fault with the conditions because,
as we have seen the successes have been
won by an absolute loyalty to the conditions,
and by the frank abandonment of every archi-
tectural convention that comes in conflict
with them. [11]

The development of the frame and its architectural
expression in the division of spaces, an outgrowth of
the economic demand for it and the technical capabili-
ties to produce it, facilitated the creation of a
166   vertical expression that would represent the most

dramatic break with towers of the past. The Eiffel
Tower had presented the potential to achieve unpreced-
ented heights through the raw utilization of a new
technology, but with the exception of its relatively
few commercial amusements, it was a structure containing
three platforms only, essentially a bridge stood up on
end. But in Chicago the new construction technology
was promoted and developed not by a single innovator
eager to prove the results calculated in a carefully
engineered design, but by the new demands generated by
the embryonic existence of corporate enterprise. For
Frank Lloyd Wright the coincident requirements of
enterprise and the availability of a mechanical means
to meet them were inseparable aspects of the same
social mechanism; the commercial field was "naturally
ripened first by the machine. The tall office building
is the machine pure and simple."[12] According to Colin
Rowe, the architects simply accepted the conditions
imposed by the speculator and worked with them; the
office tower was no more than the rational result of
investment. The characteristics of the Chicago context
readily became apparent in the ubiquitous expression
of the frame, the chief constituent office tower ele-
ment that later was to become its strongest symbolic
attribute. For Rowe, the frame possessed a value for
modern architecture not unlike that which the column
held for classical antiquity.[13] By establishing a
common ratio throughout the building to which all parts
were related, it generated a system of its own to which
all components were to become subordinated.

Louis Sullivan was determined to evolve a personal
style of architecture within the Chicago context and
through drawings and theoretical writings delineated

167

his approach. He was aware of the social, technical
and economic milieu out of which the Chicago architec-
ture grew:

> Architecture is not just an art to be
> exercised with a greater or lesser degree
> of success. It is a social manifestation.
> If we want to know why certain things are
> as they are, in our architecture, we must
> look to the people; for our buildings as
> a whole are an image of a people as a
> whole, although specifically they are the
> individual image of those whom, as a class,
> the public has delegated and entrusted its
> power to build. Therefore, by this light,
> the critical study of our architecture
> becomes, not a study of art... but in
> reality a study of the social conditions
> producing it.... [14]

He was critical of the contradictions involved in the
production of architecture in Chicago, but believed
that given suitable consideration they could be over-
come: the tall office building only presented another
contemporary problem that demanded a timely vital solu-
tion. [15] Inspired by the integrity of Henry Hobson
Richardson's work which was "perfectly graded and
finished according to classical canons", Sullivan
sought to apply these compositional principles in his
formulation of a skyscraper aesthetic. [16] He realized
that the essential feature of the skyscraper was its
numerous identical floors that obviously could not be
differentiated without interrupting structural contin-
uity. He therefore treated this potentially over-
whelming portion of the tower as a single major com-
ponent of the whole, contrasting and emphasizing its
dominating verticality with the horizontality of the
base and the attic story. These three components were
each designed in relationship to the essence of the

tower in its totality. In the central and greatest
part of the composition the office stories were "piled
tier on tier, one tier just like another, one office
just like all other offices - the office being similar
to a cell in a honeycomb, merely a compartment, nothing
more." [17] Based on a room containing adequate floor
space and height, the office cell predetermined the
standard structural unit. Seeing beyond the simple
abstraction of the frame or cage, Sullivan had realized
that the most dramatic change in the conception of the
tower occured in the three-dimensional compartmental-
ization of inhabited space. However, he accepted the
creation of office space as a necessary response to new
demands and went on to dicuss the aesthetic merits of
his method of resolving the problem:

> We must now heed the imperious voice of
> emotion. It demands of us: what is the chief
> characteristic of the tall office building?
> And at once we answer; it is lofty. This
> loftiness is to the artistic nature its
> thrilling aspect. It is the very open
> organ-tone in its appeal. It must in turn
> be the dominant chord in his expression of
> it, the true excitant of his imagination.
> It must be tall.... It must be every inch
> a proud and soaring thing, rising in sheer
> exultation....

In a later response to this declaration, Mumford
asserted that socially, skyscrapers encouraged all
the characteristic American weaknesses, such as the
love for "abstract magnitude," the interest in "land-
gambling" and the desire for "conspicuous waste."
Though these deficiencies did not lessen the inventive-
ness of the architects of the Chicago school, Mumford
believed that

169

> ... more than anything the mischief lay
> in the notion on the foundation of
> practical needs the skyscraper could or
> should be translated into a proud and
> soaring thing. This was giving the sky-
> scraper a spiritual function to perform:
> whereas, in actuality, height in skyscrapers
> meant either a desire for centralized
> administration, a desire to increase
> ground rents, a desire for advertisement,
> or all three of these together - and none
> of these functions determines a "proud
> and soaring thing." [20]

In addition to the frame, or structural system, and
the materials necessary to produce it, according to J.
Carson Webster the elevator is the one additional
essential element required for the development of the
skyscraper. As the compartmentalization of space
drastically modified the appearance of the tower, so
did rapid access to offices in the sky by elevator
contribute to a new way of perceptually experiencing
the tower, especially on the part of transitory inhabi-
tants. For Webster, the elevators are necessary for
the office tower to be built, "human demands being
what they are." [21] However the philosopher Gaston
Bachelard in contemplating more than their functional
meaning focuses instead on the spatial experience of
climbing in an idealized tower where "the dreamer
succeeds in getting out of the depths of the earth
and begins his adventures in the heights." [26] He
offers an explanation for the changed spatial experi-
ence in the present day office tower:

> From the street to the roof, the rooms pile
> up one on top of the other, while the tent
> of the horizonless sky encloses the entire
> city. But the height of city buildings is
> a purely exterior one. Elevators do away

with the heroism of stair climbing so
there is no longer any virtue in living
up near the sky. 23

Webster believes that the essence of the skyscraper
is that it combines ordinary spaces such as those often
found in low structures with an extraordinarily tall
form. We are not unaccustomed to seeing such great
height in steeples, civic monuments, or observation
towers, but it is rather surprising, although we have
come to accept the economic motivation, that an office
building should need to be high, or that we should
feel the necessity to scale the heavens providing an
extravagant means of access to activities that can be
accomplished just as effectively at grade level. For
Mumford the elevator was one of the most dubious chara-
cteristics of the tall building. He questioned the
economy of vertical transportation at "the maximum
rate of nine miles per hour" and the waste of the
internal volume of the building in the unused portions
of the elevator shafts.[24]

Sigfried Giedion considered the Chicago school and
in particular the Reliance Building one of the chief
architectural developments in the progression of
events leading to the ultimate expression of the modern
office building. Referring to it as the "swan song"
of the Chicago school, he claimed that

> ... in a broader sense, it might perhaps
> be said to have grown out of the Chicago
> soil itself, to be a reflection of the
> high architectural level that has been
> reached in that city... its airiness and
> pure proportions make it a symbol of the
> spirit of the Chicago school... Mies van
> der Rohe's scheme for a skyscraper of

171

glass and iron is the dream of a European
architect in the year 1921. The points
of departure for dream projects of this sort
should perhaps be sought in works like the
Reliance Building of some three decades
earlier. But it may be that this Chicago
building is something more than an incentive
for fantasy: an architectonic anticipation
of the future. [25]

Colin Rowe was later to clarify the differences between

the Reliance Building and Mies' project, stating that

understanding these differences need not involve any

great exercise of critical acuity. Actually the

approaches taken by the designers of the two structures

appear to be diametrically opposed: one is an abstract

solution to a general problem, an idealistic projection,

a utopia highly charged with symbolic significance;

the other is designed specifically to meet existing

requirements, a direct response to a technical and

functional problem. One evidences complicity and the

other protestation. For Mies the tower was a symbol

of a technologically oriented future society; in

Europe the skyscraper could take on the characteris-

ics of this sort of dream, a status it couldn't

achieve in America, in the face of the much too

apparent economic reality. [26] But in Mies' "Working

Theses" of 1923, two years after his presentation of

the glass skyscraper he was to write about the purpose

of the tower:

The office building is a house of work
of organization of clarity of economy.
Bright, wide workrooms, easy to oversee,
undivided except as the organism of the
undertaking is divided. The maximum
effect with the minimum expenditure of
means. The materials are concrete iron
glass. [27]

Consequently, despite his initial utopian projections
and Rowe's interpretation of them, Mies' understanding
of the office tower was not far divorced from its
understanding by the architects of the Chicago school.

An unprecedented set of social and economic conditions
demanded concentration of commercial activities, aug-
menting the value of land supporting such concentration,
facilitating the evolution of increasingly higher
structures that essentially multiplied a given site
area. The adoption of the uncompromising expression
of the frame by Chicago architects not only initiated
the development of a structure that would become later
the tallest type of tower, but also essentially trans-
parentized the tower by opening interior spaces and
in conjunction with glass, the exterior facade, a ges-
ture creating broad expanses of space and flow of
light, presenting a startling contrast to earlier heavy
enclosed towers. The new material iron, dramatically
tested in the virtually empty "useless" Eiffel Tower,
a tower unrivalled in its openess, was now integrated
with a strictly utilitarian purpose. The elevator
reinforced such an integration; now one was able to
justify commercial towers of heights not previously
considered attainable in light of potentially incon-
venient vertical circulation. Never had the tower been
so useful. But though this radically transformed
tower appeared as a cohesive, unrestrained final solu-
tion, it realistically represented a collection of
disparate contextural attributes that even Sullivan
professed to acknowledge. The new towers, in their
severe disjunction with earlier tower conventions, for
Giedion played a critical role in the initiation of the
indirect progression to the pure, formal expression of

173

the modern office building. Such a disjunction and
the progression that followed it was meaningless for
Wright, however, because it was inextricable from the
conditions that promoted it:

> To such the skyscraper will be great
> monuments marking the spot where pride
> once stood to declare that progress is
> necessarily commercial, twentieth century
> gravestones. Not milestones on the road
> to progress <u>as we would like to believe.</u> [28]
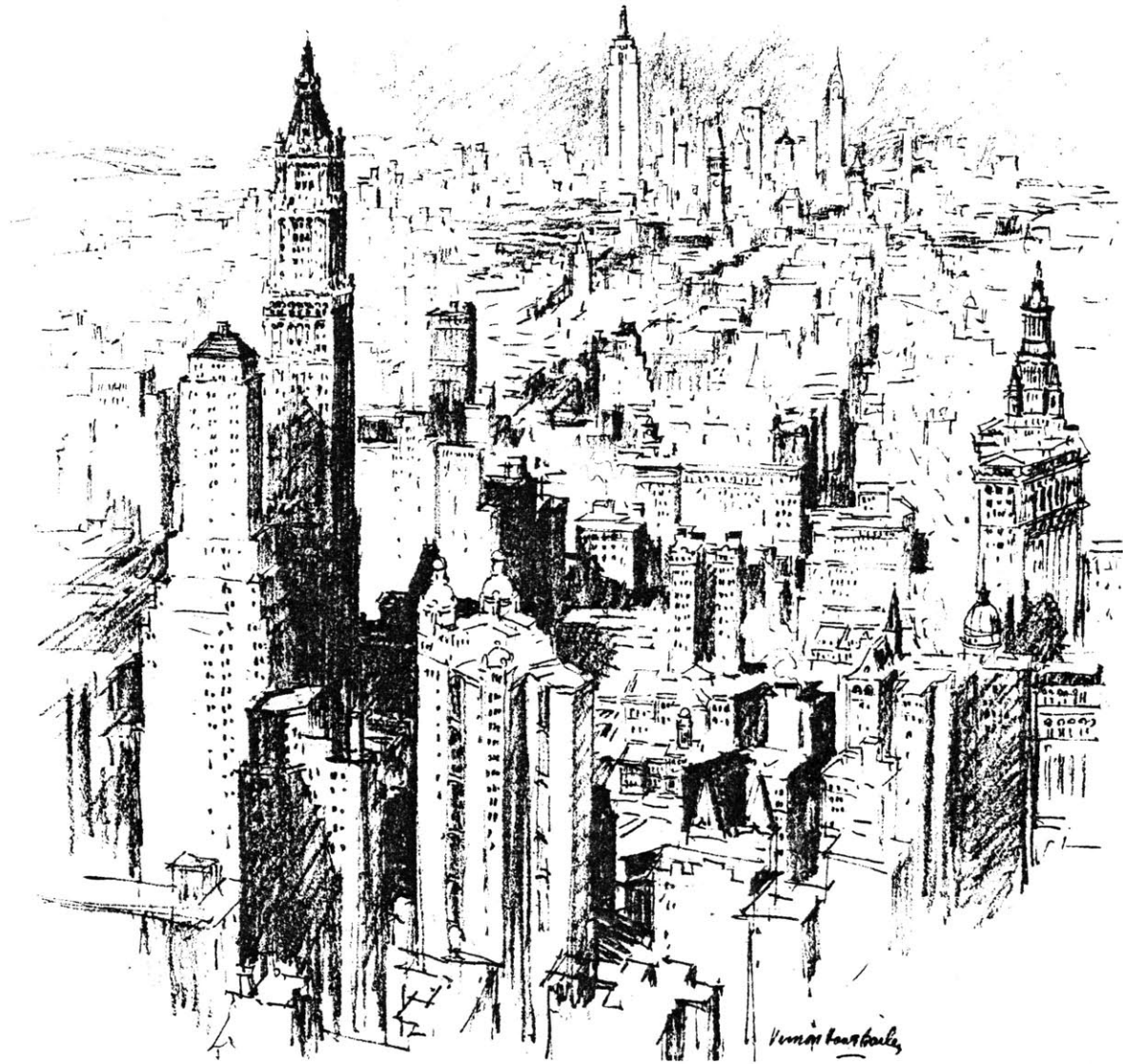
NEW YORK: THE EMPIRE STATE AND THE WOOLWORTH BUILDINGS

The skyscraper became a symbol of prestige for the American city; it was as much desired on the broad acres of western cityscapes as on the tightest plots in Manhattan. [1] When a skyscraper was proposed for Portland, Oregon in 1911, it was assumed that the incentive for its construction was civic as well as commercial: it was in part projected to "advertise" the town. [2] Competition occured between cities as they attempted to assume a Manhattan-like massiveness: the image Manhattan presents the world in the unprecedented arrangement of its towers makes it an exemplary, enduring symbol of America. As the street plan of the city comes irregular at its tip they jostle together like the uncontrolled "comeptitive crowd" they in reality are. [3] In their density and massiveness they form a powerful first impression of the distant spectator.

Though it is commonly believed that the commercial office tower was invented in Chicago, it received its highest expression in New York. In the year 1900 the city of Chicago had passed an ordinance that practically outlawed the skyscraper by placing the allowable height limit at 260 feet and in 1914 lowering the limit to 200 feet. However, such ordinances were not instituted in New York and therefore it was not prevented from becoming known for its towers. As early as 1875 it began a transformation from a horizontal to a vertical

52. New York, view of the Empire State Building from 60th floor at 40 Wall Street, Woolworth Building in left foreground, by Vernon Howe Bailey

177

city through the erection of a series of tall office buildings. In 1865 commercial buildings were generally about five stories tall and sixty feet high, but within a period of seven years architects were planning buildings four times as high. In New York innovation in construction played an insignificant role. The potential of the frame, as it was to be developed and expressed in Chicago was virtually ignored, instead self-supporting load-bearing masonry was used in combination with iron columns for interior support. The elevator and fire-proofing methods contributed most significantly to increasing height, although they were subservient to the dominating factor of economics. [4]

In the early part of the twentieth century, the tall office building seemed to present the most exciting problem on the New York architect's drafting board. In their enthusiasm over their role in the creation of a new skyline, designers were able to reconcile their aesthetic sentiments with large scale enterprise. Sullivan's direct approach towards structure was de-emphasized as the more common skyscraper treatment became the classical tripartite formula of column, base and capital. Its only serious rival was also archeological, but emphasized the verticality of tall buildings and crowned their tops with Gothic detail. The Woolworth Building initiated this approach. The impressiveness of the Woolworth Building at the time primarily resulted from its isolated position in the cityscape and its vertical expression of the frame. Delineated and fire-proofed with white terra cotta, vertical piers soared to their culmination in the Gothic detail. The decoration exhibited more than a process of simple magnification; from the street level or at

53. New York, the Woolworth Building

179

close observation, it was distinctive and elegant in
its series of projections, recessions, and depth of
light and shawdow. Constructed in 1913 by Frank W.
Woolworth at a height of 729 feet, it was for a long
time the tallest tower in the world next to the "skele-
ton" of the Eiffel Tower. [5] The builder was fascinated
with its technological wonders: there were "3000 tele-
phones in operation throughout"; "twenty-nine high-
speed electric lifts", the highest in the world at the
time and containing innumerable safety devices; it did
not "sway or vibrate" and would stand up to a "hurri-
cane blowing at the fantastic velocity of 200 miles
an hour"; the sub-basement housed a "power plant which
had "four mighty engines and dynamos operating day and
night... the most efficient known to engineering
science." [6] When it opened on April 24, 1918, Presi-
dent Wilson pressed a button in the White House and
80,000 brilliant lights instantly flashed on. It
achieved fame abroad; approximately 290,000 people
from 60 countries visited its observation deck each
year.

The Woolworth Building design was an example of the
contemporary attitude that a historical style should
be applied but that structure should also be acknow-
ledged. Tafuri claims that when it was designed, the
architectural process had actually been split in two;
the effort focused on formal design was reduced to
allow concentration on structural and functional
aspects. In this way, the purely conventional chara-
cter of "styles" became emphasized and the organic
conception of architecture was undermined as architects
fell into line with the methodology of City Beautiful.
Such an approach was to only further encourage the

demand for "idealistic masks" on the part of enter-
prise.[7] But for Rector S. Parkes Cadman, who endorsed
the "Cathedral of Commerce in a prayer-book brochure
(did his parish, likewise, receive a financial endor-
sement?), the structure was a glorious expression of
the business "spirit":

> Here, on the Island of Manhattan, and at its
> southerly extremity, stands a succession of
> buildings without precedent or peer.... Of
> these buildings the Woolworth is the Queen,
> acknowledged as premier by all lovers of the
> city and the commonwealth, by critics from
> near and far, and by those who aspire toward
> perfection, and by those who use visible
> things to attain it. When seen at nightfall
> bathed in electric light as with a garment,
> in the lucid air of a summer morning, piercing
> space like a battlement of the paradise of
> God which St. John beheld, it inspires feel-
> ings too deep even for tears. The writer
> looked upon it and at once cried out, "The
> Cathedral of Commerce" - the chosen habitation
> of that spirit in man which, through means of
> change and barter, binds alien people into
> unity and peace... [8]

Montgomery Schuyler believed that for a "distinctly
utilitarian" structure such as the Woolworth Building,
the great architectural success was "eminently the
success of an expressive treatment." Such an achieve-
ment, especially in the crowning feature where space
must have been sacraficed, commemorated the client's
"sense of civic obligation" as well as the "the inven-
tiveness and sensibility of the architect." [9]

Records in altitude in New York were ephemeral. In
1901, the Park Row Building boasted of its eminence
on the skyline, claiming that it "scraped the highest
clouds" in New York, but shortly thereafterwards it

was followed by the Singer Building, the Metropolitan, and then the Woolworth Building. The Woolworth Building remained the tallest office building in the world as New York continued building enthusiastically in the years 1925 through 1932, the projects in progress withstanding the impact of the Depression, and in 1930 the Chrysler Corporation completed its tower at 1046 feet. It was now legitimately the highest tower in the world, exceeding the Eiffel Tower by 62 feet. But this record was fleeting. One year later in 1931, the Empire State Buiding was topped off at 102 stories with a total height of 1,250 feet. Such an obvious competitive display led Montgomery Schuyler to ask as early as 1913:

> What next? Truly, what is the limit?
> It is very clear the limit is commercial,
> not technical. In the absence of
> restraining laws, every projector of
> a building built for profit will carry
> it as high as he thinks it will pay him
> to carry it.... Meanwhile the competition
> is not only commercial, but in a measure
> artistic.... And probably there is no
> cultivated and ambitious architect, even
> though as yet "no man hath hired him"
> to do a skyscraper, who does not carry
> around in his mind, and in his leisure
> moments fondle, some idea of the sky-
> scraper he would like to build.[10]

For Hugh Ferriss, whose mountainous images of cities were sublime, but almost forbidding in their primitive massiveness, the race to the sky among towers could only facilitate his urban ideal of density:

182

> The most popular image of the Future
> City - to judge by what is most often
> expected from the draughtman's pencil -
> is composed of buildings which, without
> any modification of their existing nature
> have simply grown higher and higher.
> The popular mind is apparently intrigued
> by height as such. A 60-story tower in
> New York evokes a 70-story tower in
> Chicago. What is more serious, a 60-
> story tower in New York evokes a 70-
> story tower across the street. The sky-
> scraper is said to be America's premier
> architectural contribution to date,
> popular fancy pictures the future
> contribution to be rows of still higher
> skyscrapers; in other words, it pictures
> 70-story skyscrapers side by side for
> miles. [11]

The skyscraper was an expression of the social and

economic changes characteristic of the era of its

creation. The earliest office towers were built by

insurance companies, organizations whose business was

entirely bureaucratic and whose day to day functions

created a high demand for office space. The expanding

commercial sector eventually produced on the skyline

a configuration of structures that were expressive of

the concentration needed to accomodate a hugh volume

of communication and the other transactions indispen-

sible to its existence. Support activities such as

stores, restaurants and hotels, remained advantageously

located in urban centers; their chief market had now

become the office agglomerations. Land use intensi-

fied and swelling land prices stressed the importance

of maximizing every square foot for the purpose of

supporting as much rentable office space as possible. [12]

The density of tall buildings in the absence of zoning

controls began to choke space and movement in commer-

cial centers. To maintain a minimum standard of

183

184
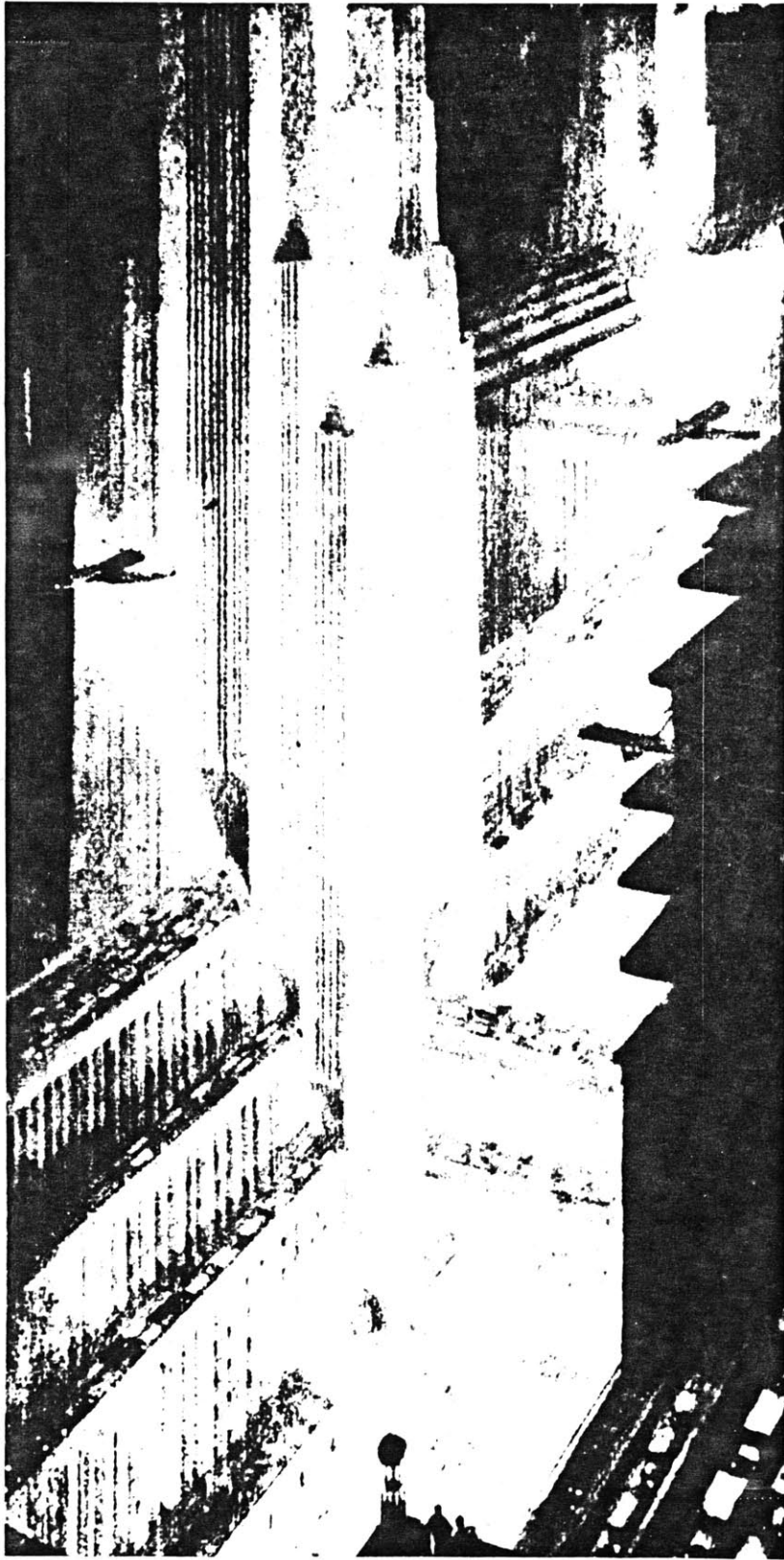
light and air and in congested areas among towers, the
first legislation to control real estate development
in New York, the Zoning Resolution of 1916, was dev-
eloped. It established legal control through city
government over heights by the establishment of pro-
gressive building setbacks determined by the rule of
the "sky angle" and in this way initiated a skyline
of towers gradually receeding at specific predeter-
mined heights as office stories made their upward
climb. Despite these regulations, inherent in the
arrangement of the towers was the shawdowy canyon-like
atmosphere created in the streets. Not necessarily
pleasant or salubrious spaces, they were nevertheless,
at least for Vincent Scully, sublime. [13] The roman-
ticism of this dense urban agglomeration is captured
in the astonishing drawings of Hugh Ferriss. Architec-
tural publications and journals were filled with his
idealized skyscraper images. The public could now
associate the lofty tower with their dreams of urban-
ized America: skyscraper development of this kind
appeared to be a reasonable and exciting prospect. [14]
Metropolis of Tomorrow opened with a dramatic descrip-
tion of the early morning fog lifting from the towers
of New York. The second section offered carefully
delineated suggestions covering set-back envelopes
and the third and final section in its representation
of an imaginary metropolis, or city of the future,
became propaganda for the type of control offered by
zoning and "regulated speculation". His drawings
conveyed the construction of the city by "mythic,
superhuman forces". The entire population of these
metropolitan visions seemed to live a "glamorously
decadent penthouse existence" unaware of social
conditions unless directly affected by them. [15]

54. Hugh Ferriss,
    "Overhead Traffic
    Ways"

185

The obscure quality of the drawings veiled them in a
serenity that failed to conceal the tension caused by
the presence of a power that would in reality be capa-
ble of creating such an environment: its brute force
was frightening. Ferris was not totally oblivious
to implications such as these that went beyond the
superficial character of his graphics, though he seemed
to savor the delight he experienced in the recognition
of underlying truths:

> Yet, if we relinquish the picturesque,
> to assume the more critical viewpoint,
> do we not begin to apprehend, in this
> headlong ascent, something ominous?
> It is not a little disturbingly remin-
> iscent of the Tower of Babel? Certainly
> there are conscientious city-planners
> who perceive, in the present trend toward
> closely juxtaposed towers, a serious
> menace. The trend indubitably exists;
> and it is therefore proper perhaps, for
> the draughtsman to indicate where it will
> lead if it is unchecked. Such drawings,
> however, far from being intended as an
> inspiration, may serve rather as a warning.
> "It may look like this - if nothing is
> done about it." 16

Essentially a commercial style, Art Deco, or Style
Moderne, dominated artistic production for the two
decades of the nineteen twenties and thirties. Because
the skyscraper was considered the archetypical American
building in the 20's and because Art Deco was consid-
ered an "international" style by architects, they
believed they had achieved preeminence in the practice
of it because of their skyscrapers, a building type
greatly admired in Europe at this time. The strength
of the Beaux-Arts tradition in New York prevented
architects from initiating a revolutionary style or

186

from completely breaking with the past and instead
led them to pursue a rephrasing of existing design
approaches. They depended first of all on, by then,
a traditional form of commercial style found in Amer-
ica, the office tower that had its beginnings in late
nineteenth century Chicago. They made no major
structural changes in this type and avoided any signi-
ficant changes of the internal subdivision of office
floors. Many of the precepts found in Louis Sullivan's
polemic for the skyscraper, "The Tall Office Building
Artistically Considered" of 1896 were applicable to
the Art Deco skyscraper. The critical attribute of
height or "loftiness" could be captured in these
towers: as Sullivan had emphasized this characteristic
with piers rising continuously from the second level
to the attic level of the building with recessed span-
drels and windows, the Art Deco skyscrapers also relied
on piers, whether heavily articulated or slender and
in their verticality they became the dominant feature.
The most obvious feature of Art Deco was its gracious
use of ornament; rich textures and color were gained
through the combination of a variety of materials,
primarily stone, brick, terra cotta and metal. The
ornament placed at the top of the buildings was scaled
for a distance whereas detail at the street level and
in entrance areas and lobbies became more tactile in
appearance, suited to the immediate experience of
passers-by. Evolved primarily to serve big business
in New York, inherent in the stylistic approach of the
American version of Art Deco was the potential for
first-rate advertising: it effectively attracted and
kept the attention of the public. Unlike the creations
of the International Style, it provided a sensory

experience through texture, color, decoration and
tactile effect. It was theatrical. [17]
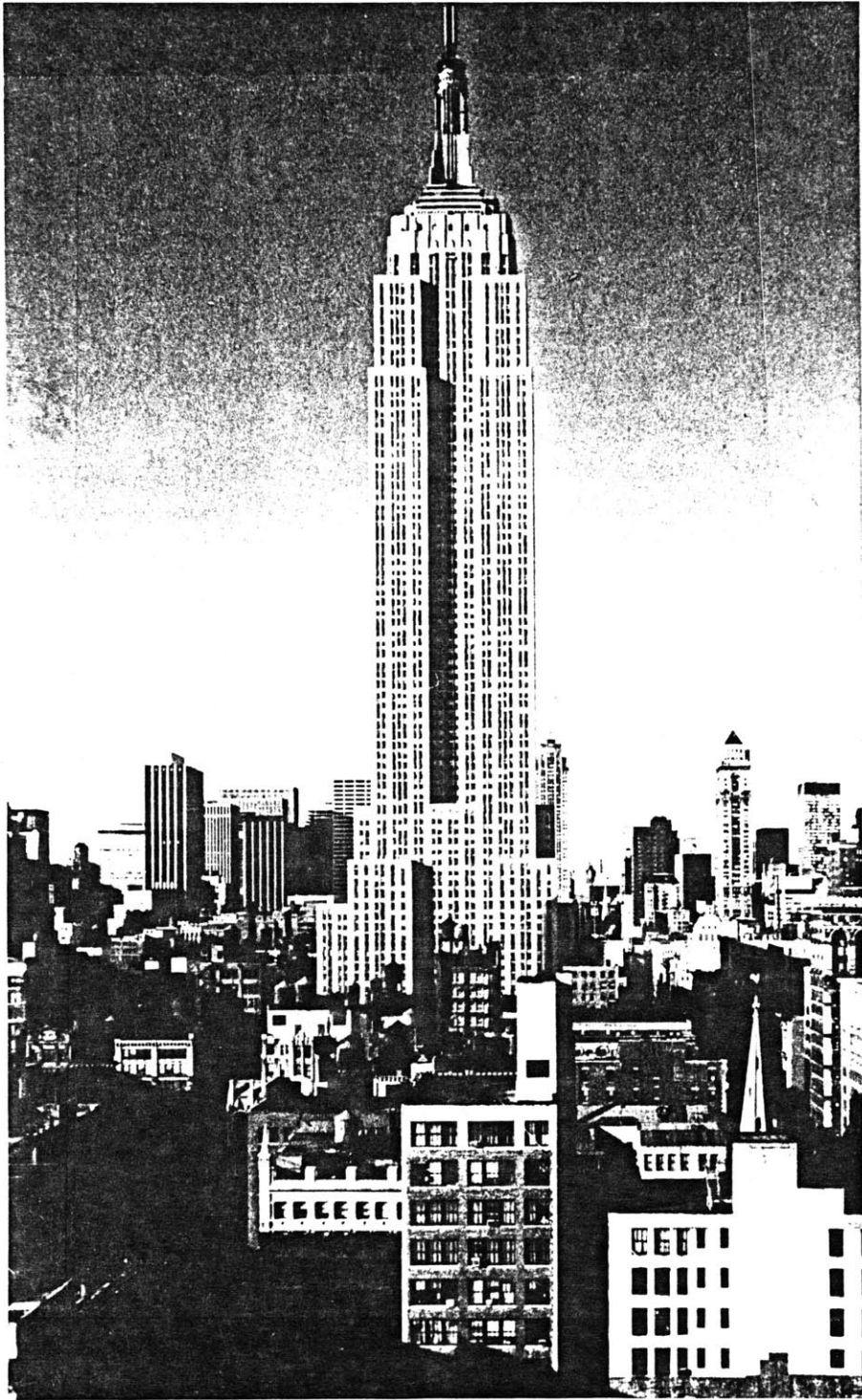
One of the last towers of the short period of production of skyscrapers in the Art Deco style was the Empire State Building designed by Shreve, Lamb and Harmon. At the time it was designed the endeavors of the Art Deco architects had been affected by their acute awareness of the machine as a necessary feature of modern life. The handcrafted Expressionist-influenced exotic quality of the earlier Art Deco style had disappeared and was replaced with a more severe, austere, streamlined imagery. Consequently, the forms of the Empire State building appear more machine-like and its crowning device, a mooring tower for dirigibles was functional, at least in a symbolic sense.[18] The massing of the tower follows the setback requirements of the zoning law. The entrance lobby is three floors high; the core of the building is in its center, located with essential provisions for elevators, stairs, and building services. The building base, impressive in its monumentality, is topped with a 60-foot wide terrace that sweeps back to the base of the tower. From this point the tower steps back gradually, meeting specified zoning requirements for light and air, and then soars an interrupted distance towards the sky. The elevator system was not only one of the key generators of the plan, but also affected the height to which the building could rise. In the early design phase planning efforts were primarily concentrated on the thirtieth floor of the structure where the tower had to meet the zoning requirement restricting the size of its floor area to one quarter of the property area. This meant a trade-off had to be made between the size of the core and the floor area available for rent. The most economical floor arrangement was sought that simultaneously provided the greatest

55. New York, the
    Empire State
    Building

number of elevators. The final plan consisted of a
ring of office space 28 feet deep surrounding the core.
The overall size of the floor diminished as the build-
ing increased in height and the elevators decreased
in number. The weight of the envelope was reduced by
substituting masonry with metal windowns, cast alumi-
num spandrels, and the chrome-nickel-steel alloy trim.
The spandrels were dull silver, sandblasted to obtain
a rough textured surface and the shiny column-like
trim emphasized the verticality of the structure. A
critical design determinant was speed of construction:
details were thoroughly analyzed by the builders and
architects, handcrafted work was avoided as much as
possible, and prefabrication was relied on to the
extent practicable at the time. Materials were shipped
from all over the country, pre-cut or pre-fabricated
in preparation for the assembly-line construction
process. [19]

The owners of the building were a group of speculative
developers: John Jacob Raskob, the co-creator of
General Motors, Coleman duPont and Pierre S. duPont,
the latter a president of the chemical industry's
leading empire, and two lesser tycoons, Louis G. Kauf-
man and Ellis P. Earle. They chose the ex-governor of
New York State, Alfred E. Smith, as their leader. Their
dream was to build a skyscraper that in its simple
beauty surpassed any skyscraper ever designed and that
met the requirements of the most meticulous tenant in
the suitability of its interior spaces. Demolition
began on the Waldorf-Astoria hotel that was currently
occupying the site on the first of October in 1929.
Despite the stock market crash, the project moved
ahead. Earlier financial investments meant the

developers could take advantage of the favorable
economic conditions for construction that were brought
about by the Depression. [20] The first upright piece
of steel was set on April 6th, 1930 and by December
1st of the same year the steel frame had been comple-
tely topped out at 1,250 feet. On the same day the
limestone exterior was carried its full height and the
sequence of interior construction proceeded it, com-
pleting the building considerably ahead of schedule on
May 1st, 1931. Constructed of 58,000 tons of steel,
ten million common bricks, nearly three million face
brick and pieces of terra cotta, nearly three million
square feet of limestone and nearly 70,000 cubic yards
of concrete, it is obvious that a considerable amount
of organization, skill, and attention to the minutest
detail was required. Several innovative approaches
were used to speed construction: the equipment floors
were carefully planned to distribute materials effi-
ciently, there were railways in the basement and on
the first floor, an overhead monorail, seventeen
internal hoists, and gigantic brick hoppers that
delivered the bricklayers their material "untouched
by human hands." [21]

More than 3,000 men worked on the project daily; the
press was fascinated with them and called them "poet
builders" or "sky boys who ride the ball to the 90th
floor and higher, and defy death to the staccato
chattering of a pneumatic riveting-hammer." [22] In
reality it was rare for a building of this magnitude
to be constructed without the sacrifice of workers.
According to Mike Cherry in On High Steel, during the
Depression, gangs of workers would wait on streets and
near job sites so that when a worker fell, they would

191

be immediately available to take his place. The efforts

of safety campaigns and insurance companies were futile

because of the pressure by developers to expedite

projects.[23] Unlike the glorified heroic version of

the worker depicted by the press, Mike Cherry relates

the job conditions more realistically, from a standpoint

that could only be acquired through the intimate rela-

tionship afforded by direct experience:

> One day one of the connectors went to
> pieces. There are endless stories of
> men freezing on the iron, but I've seen
> it only happen once. He was coming out
> from his connection toward the choker to
> cut the piece loose when one of his feet
> slipped off.... He dropped to the beam,
> curled his arms and legs around it, and
> put his face down on the top flange,
> which knocked his hat off.... I was
> almost directly below him, a vertical
> distance of no more than twenty-five
> feet, and could see his hands gripping
> the bottom flanges. The knuckles were
> white. His nose and chin showed over
> beam, and they, too, were white....
> The other connector went out the beam
> to the man, sat down, and began talking
> to him. He tried to pry one of
> MacDonald's hands away from the flange
> but failed... "Love pats won't help,"
> called the signalman, "you got to cold
> conk him." He and the other connector
> exchanged stares. The connector shrugged,
> put a three-inch bolt in his fist, and
> gave MacDonald a shot that should have
> knocked all his teeth out. Blood spurted
> everywhere and MacDonald's body went
> limp. The crane lifted him up, swung
> him a couple of feet to one side, and
> lowered him to the ground.[24]

In 1971, the first of the twin towers of the World

Trade Center in Lower Manhattan superseded the 102

stories of the Empire State Building with its 110
stories and a total height of 1,350 feet. Though it is
no longer the highest building in New York, the Empire
State Building remains the symbol of the city in many
ways like the Eiffel Tower is a symbol of Paris. It
is still one of the largest tourist attractions in
the world. It draws more people than other sites in
New York such as the United Nations Headquarters,
Radio City or the Statue of Liberty. The views from
the observatory encompass the city and extend under
conditions of high visibility for about fifty miles
into five states. Hollywood used the heights of the
dirigible mast in 1933 for what was to become one of
their classic films, King Kong. Here the mortal
"primitive" beast was conquered in the midst of
"advanced" civilization as the building made a claim
to immortality. [25] On an overcast day in July 1945,
an Army Air Force bomber that had apparently just
changed its course from La Guardia to Newark airport
zigzagged across the foggy skies of Manhattan at 1000
feet, dodging the tops of buildings until the Empire
State Building "suddenly appeared before him out of
the mist." [26] The plane plunged into the building as
its wings were torn off, creating a 20 foot puncture
in the facade. It struck an I-beam in an elevator
shaft causing two elevators to drop from the eighteenth
floor to the sub-basement; the cars were destroyed but
the lone elevator operator survived. In 1955, the
American Society of Civil Engineers designated it one
of the Seven Wonders of American Engineering. The
lobby contains sensational illuminated depictions of
the Eight Wonders of the World, the Empire State Buil-
ding, of course, being one of them. Because of its

prestige as a landmark and because it has become a myth
in the public mind, it has acquired an edge on its com-
petitors in the office space market and can attract
tenants from all over the world.

For Tafuri, who believes the skyscraper is an "element
of mediation" that does not wholly identify with the
reasons for its own existence and therefore remains
detached from the city, the Woolworth Building in its
soaring telescopic logic nevertheless corresponded to
its situation on the urban scene and the Empire State
Building could justify its height by the pioneering
function it served in Manhattan. Until the criticism
of the 1940's from progressive circles, one was still
able to sense the integration between the skyscraper
and the metropolis. [27] Diana Agrest found that the use
of the Gothic and Beaux-Arts eclectic styles helped
make the towers, representations of economic "progress"
and its associated set of values more acceptable, to
transform "fiction" into "verisimiltude". [28] The
expression achieved by the use of a stylistic convention
for amelioration of the frame alluded to past monuments
and their associated set of past values. Yet the arti-
ficiality of such a gesture can be understood with
little visual acuity. What the New York architects
and their clients had done was to find a more palatable
method by which to deal with the very same conflicts
faced by the Chicago School. However, the associa-
tional value of post World War I skyscrapers is more
than stylistic, they also represented an era of econo-
mic optimism of the quality expressed by Rector Cadman.
Though the Empire State Building was built during the
Depression, a propitious situation for the constructor,
an adverse arrangement for workers, it managed to retain

194

the attributes Scully was referring to when he claimed
the Depression killed off the "old skyscraper" and all
of its associated qualities." [29] As an increasing num-
ber of towers were built, the resulting combination of
eclectic styles reflected and reinforced one another in
their dialogue on the cityscape, providing a unity to
the totality. In the density of skyscraper construc-
tion, the isolated tower lost its previous, more common,
urban attribute as a landmark; the complex aggregation
instead became the landmark, the symbol of Manhattan to
the world. In the chaotic mountainous image the Empire
State Building rises slightly higher, just enough to
insure recognition by the casual observer; for this
reason and because its tallness was the result of a
pioneering effort, an achievement with which it retains
association despite construction of taller building, it
has recognized more than the level of imagery found in
the aggregation: if one building is representative of New
York, it is the Empire State Building. Because it has
achieved this status, because it forms an inseparable
architectural bond with the city, because it was known
as an amazing achievement of construction technique
and coordination, because it was the tallest, because
it is conventional and therefore "acceptable" stylis-
tically, because with time it has become a greater and
greater myth, it is much easier to associate it with
many of the qualities we attribute to towers of the
past. It is a tremendous effort to peel off this com-
plex layering of meanings to find that its essence,
its frame, the mundane purpose for its existence, has
been most convincingly disguised.
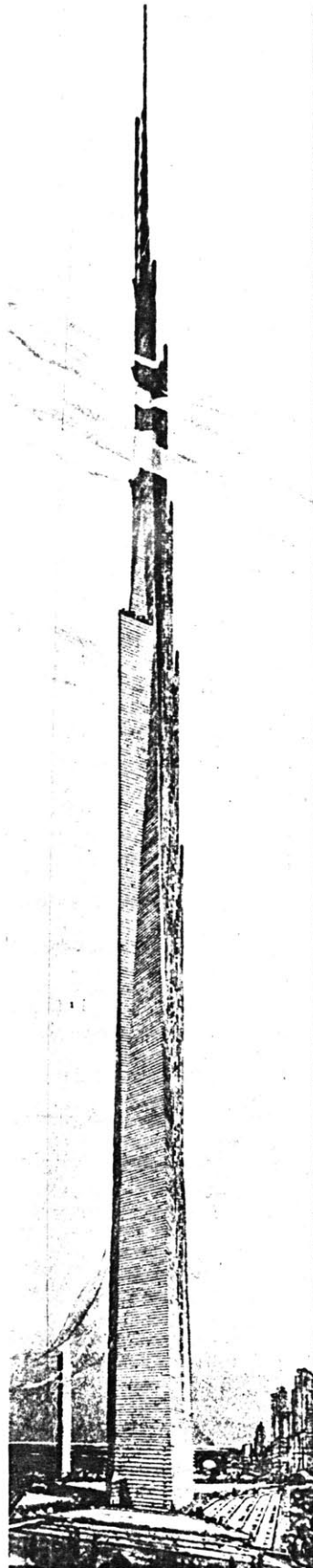
FRANK LLOYD WRIGHT: MILE HIGH SKYSCRAPER

Frank Lloyd Wright's attitude towards the skyscraper
was established as early as his Hull House lecture of
1904, "The Art and Craft of the Machine". By desig-
nating the modern office building a "machine pure and
simple", he was referring to both the social phenomenon
that created and used it, or commercial enterprise, and to
the building technology necessary for its creation, or
the "steel frame of commerce." [1] For Wright, the sky-
scraper eclecticism prevalent in New York was the
inevitable result of a conflict between the machine,
or commercialism, and the steel frame, or the structural
tradition initiated and developed in Chicago. Consequ-
ently, the notion of the machine inherently contained a
dichotomy, a conflict that was to be emphasized in
his later writings. The eclectics, or "fashionable
followers of Phidias" had attempted to conceal the
frame, to make it another type of architecture, a
monument or a minster. [2] He believed that though one
may object to what the frame represents, one should not
hide the truth; it is not difficult to find deceit in
such masking.

In a 1918 lecture called "Chicago culture", Wright
again criticized the typical approach of the American
skyscraper architect who denied expression of the true
asethetic of height by simply stacking a series of
artifacts. He cited Louis Sullivan's skyscraper
polemic, for it was Sullivan who "seized its height as

56. Frank Lloyd Wright,
Mile High Sky-
scraper

197

198
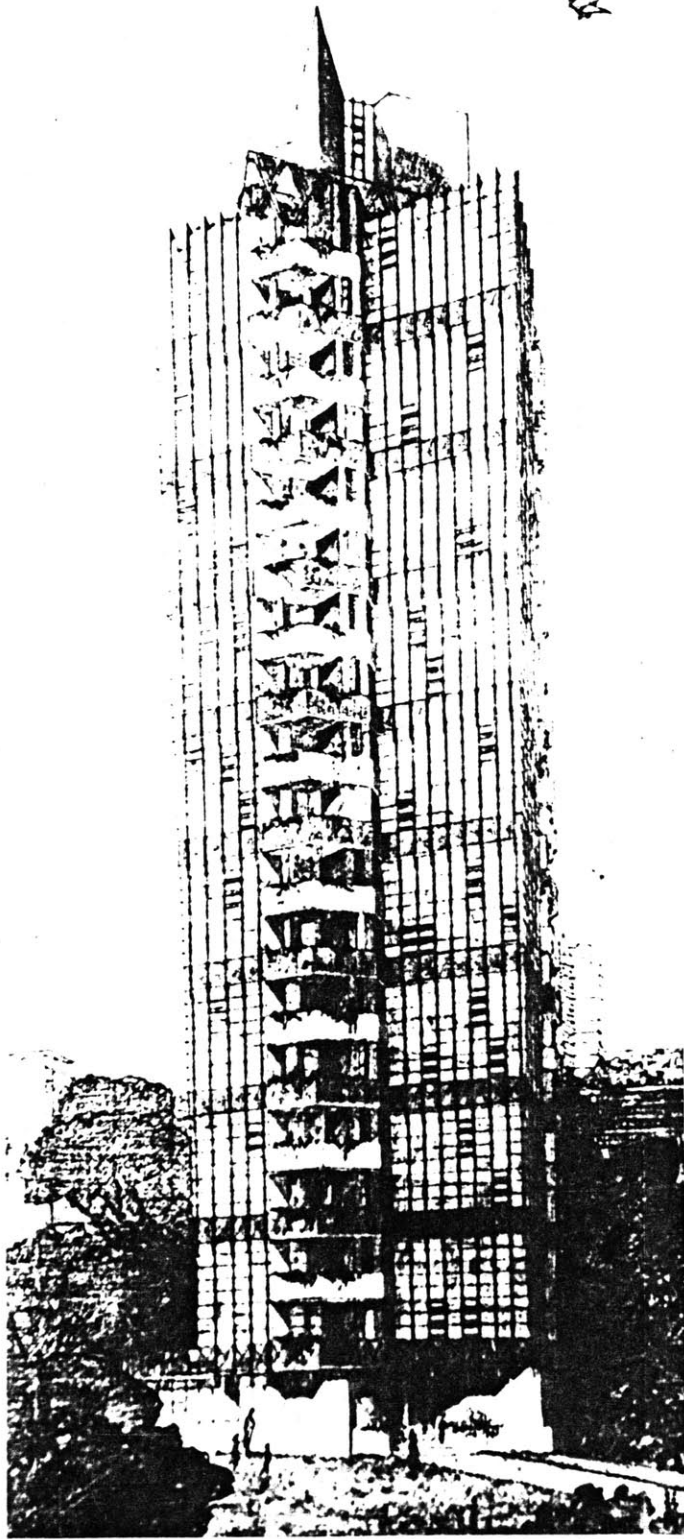
a characteristic feature and made it sing; a new thing
under the sun!"[3] Wright's loyalty to the line of
development of the Chicago tradition was shown in his
design for the National Life Insurance Building of
1920-25. However technically it represented a dramatic
modification of the frame developed by his Chicago
counterparts: its structure of large pylons carrying
electrical, plumbing and heating conduits supporting
cantilevered floor slabs was planned for fabrication on
a unit system, the application of the "kind of stand-
ardization that gave us the motor car."[4]

But in 1924, he forcefully spoke out against the
skyscraper, not only as a building type that had been
exploited by enterprise, but as a phenomenon that
facilitated centralization. In "Experimenting with
Human Lives" he admits that Chicago and New York were
nodes of intense, concentrated activity and had no
choice but to resort to the skyscraper, therefore it
was an excusable alternative, considering the condi-
tions that prompted its origination. But otherwise it
was only a commercial expedient, a false expression of
civic pride, and dangerous to construct and maintain.
Skyscrapers only encouraged congestion as cities
increasingly became less habitable for those who valued
their individuality: "who sleeps, who lives in New York
and Chicago's canyons if he can get away?"[5]

Although St. Mark's Tower was designed for "centrali-
zation or decentralization", Wright believed it would
be best utilized as a means of freeing the city of
"demoralizing congestion", enabling people to spread
out in the country and up towards the sky.[6] Such an
attitude towards the dispersal of the congested city

57. Frank Lloyd Wright,
St. Mark's Tower

199

paved the way for the creation of Broadacre City in the early 1930's. The Tower was a reinforced concrete floor system cantilevered from a central supporting structure, a tree-like configuration with a "tap-root" foundation, exemplary of Wright's organic approach to architecture. The exterior was covered with a scintillaitng membrane of copper and glass. Articulated volumes of space were generated around the central structural members, conceived in plan as a series of nuclei which, for Colin Rowe, explained Wright's avoidance of the steel frame; its rigid cellular divisions prevented the fusion of structure with space.[7] Conceptually, the St. Mark's Tower scheme was the basis of virtually all of Wright's later skyscraper projects. Originally designed for St. Mark's Park along Second Avenue, between 11th and 12th streets in New York, the tower was later taken from its urban context and placed in the Broadacres plan where, by attributing it with a key role in the formal organization of the scheme, Wright reinforced his initial premise that the skyscraper was only feasible if placed in an unbounded landscape. As the "tree that escaped the crowded forest", it was eventually realized as the Price Tower in Bartlesville, Oklahoma.[8] For Giorgio Ciucci this isolated location was symbolic of the "new conquest" possible only in America's provinces.[9] Aggregations of the St. Mark's project appeared as the Crystal Heights Hotel design of 1940. Its projected location was an outlying area of Washington where "it was intended as a response to the official architecture of the Mall."[10] The aggregation actually strikingly demonstrated the individuality of the Tower and reinforced its suitability as an isolated object. The Johnson Wax Laboratory Tower of 1939 located at Racine, Wisconsin was a version of St. Mark's

Tower in condensed form. The exterior skin transformed
from its angular, crystalline character to a banded
screen of alternating sections of brick and horizontal
glass tubes that sleekly enveloped the structure.

Wright's plans for decentralization, for replacing
the cumbersome "masonry caverns standing to the streets",
for converting the city to a park, for dispensing the
"gleaming shafts" of St. Mark's prototype through the
greenery, was "betrayed" by the "captain of industry"
who sentimentally gratified his "perverse acquired
taste" by wasting his "machine made millions in repro-
ducing an antique Gothic minster". [11] In "Tyranny of
the Skyscraper" of 1930, such skyscrapers were referred
to as "space-makers for rent" that were built to solve
the problem of congestion, yet with their increased
numbers and increased height only facilitated congestion:
"the ground area used to be multiplied by ten, it was
soon multiplied by fifty, and it may now be multiplied
by a hundred or more". [12] Such congestion led to the

> "overpowering emphasis everywhere of the cell
> in upended structure; continual slicing, edging,
> inching, in all the crowding. Tier above tier
> rises the soulless habitation of the shelf.
> Interminable empty crevices run up and down the
> winding ways of windy unhealthy canyons." [13]

In general, the skyscraper in the context of the city
was perceived in much the same way the relationship of
the skyscraper to commercial enterprise had been under-
stood by Wright earlier. The Machine represented in one
respect the technological resource that enabled the
creation of the structural framework and its fabricated
skin, but in another respect the social conditions, the
concentration of enterprise, that demanded the develop-

201

ment of the skyscraper type. For Wright, concentration of capital was actually the equivalent of the congested city. As he had surmised in his lecture of 1901, the city was also the machine:

> "If the pulse of activity in this great city,
> to which the tremor of the mammoth skeleton
> beneath our feet is but an awe-inspiring
> response, is thrilling, what of this prolific,
> silent obedience?
>
> And the texture of the tissue of this great
> thing, this Forerunner of Democracy, the
> Machine, has been deposited particle by
> particle, in blind obedience to organic law,
> the law to which the great solar universe is
> but an obedient machine." [14]

Therefore the skycraper as a commercial expedient represented the abuse of the technical developments that led to its creation, for Wright it was truly "a mechanical conflict of machine resources. An internal collision!" [15] The only solution to such a conflict was the dispersed, anti-urban Usonian settlement suggested by Broadacre City.

Wright nevertheless believed that "a tall building may be a beautiful thing." [16] When the skyscraper was detached from the conditions that produced it, the "internal conflict" of the Machine could be resolved; it inherently possessed potential for the spectacular. His proposal for the Chicago World's Fair presented an opportunity for such imaginative speculation:

> Why not, then, the Fair itself apotheosis of
> the skyscraper? Build a great skyscraper (in
> which the Empire State Building might stand
> free in a central court) devoted to all the
> resources of the modern elevator.... If
> elevators handle the population of New York,

they could handle the crowds at the Fair.
Why not handle the crowds directly from
several expansive tiers of mechanized
parking space, great terraces from which the
skyscraper itself would rise. The construc-
tion should be merely the steel itself
designed as integral pattern in structural
framing. Then concrete slabs for floors
above floor-garden floors intervening as
restaurants. Instead of glass for enclosure-
some light, transparent glass substitutes
might be used; the multitudonous areas thus
created would be let to exhibitors. The top
stories could be garden observatories,
pleasure places.... The Lake Front Park
itself would be mere landscape adjunct to a
great modern structure which might easily rise
two hundred and forty-five stories, say two
thousand five hundred feet above the lake
level - or about a half mile high. The clouds
might naturally or artifically drift across its
summit. Or effects be created by aeroplanes
laying down colored ribbons of smoke to drift
across it. [17]

Wright's romanticization of the skyscraper and his
rejection of its exploitation by industry, evidenced
the dense accumulation of vertical construction in the
city, inevitably drove him to create an idealized
version of the skyscraper that grew out of the desert
of Usonia. An exaggeration of all the facets that
across time additively could be called a "skyscraper
polemic", it was St. Mark's Tower blown to a gigantic
scale; the dream of dispersal was now another isolated
tower, but additionally a city turned in upon itself
and surrounded with an endless countryside.

Wright called it a "sky-city". A core structure
similar in concept to the Price Tower and the Johnson
Wax Laboratory Tower, concrete floors were cantilevered
from a central core that accommodated the building
mechanical and electrical systems. The exterior was

204
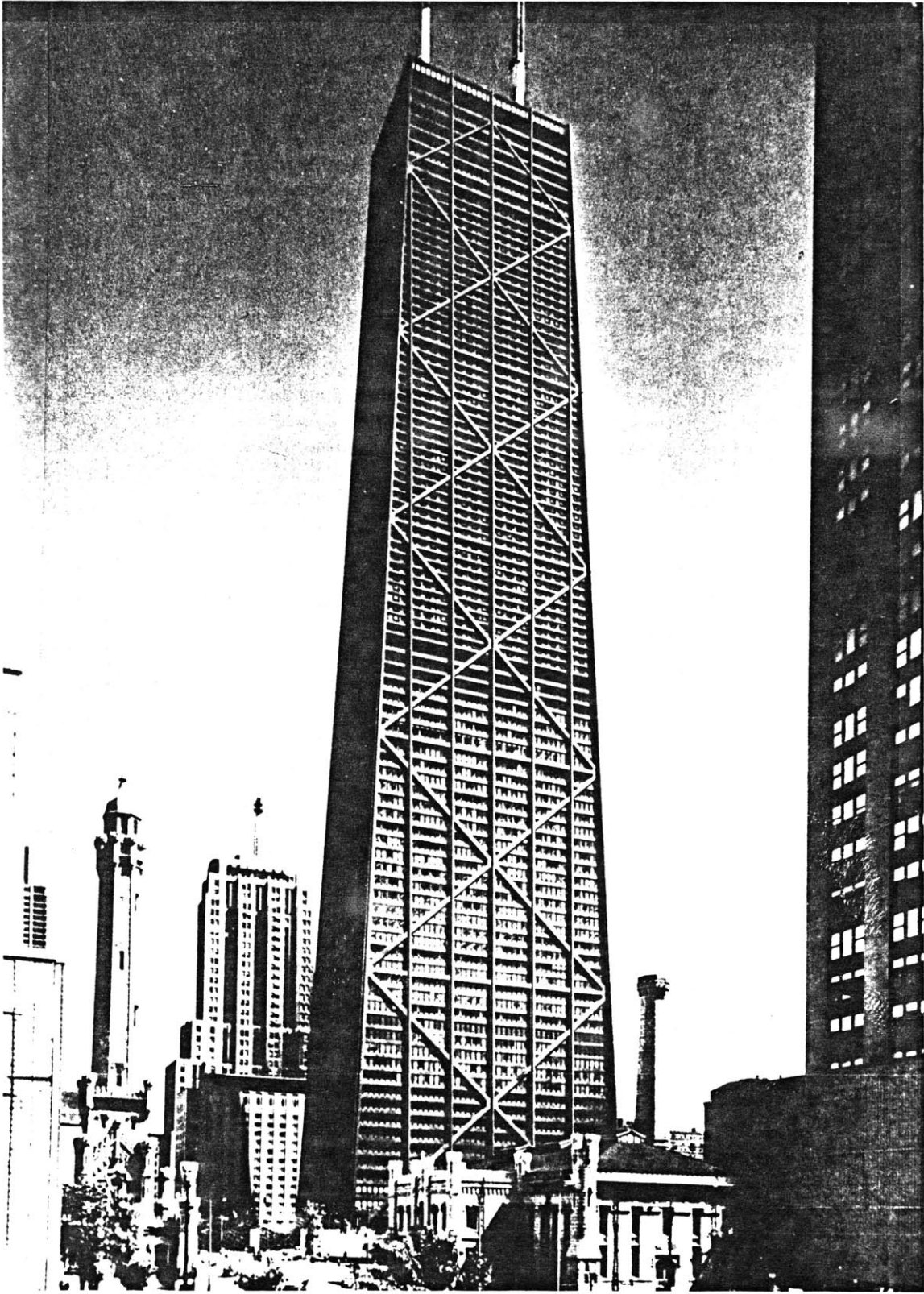
covered with golden metallic sheathing. Windows were
recessed to avoid glare, to emphasize the brillance of
the skin, and to provide a sense of protection to the
occupants. The one mile high 528-story tower could
support 130,000 inhabitants. Elevators were designed
to operate on atomic power and were capable of travel-
ling at approximately a mile per minute. Included on
the site were provisions for 15,000 automobiles and
two heliports capable of handling 50 helicopters each.

Another city within a tower that perhaps can be
considered the "realistic" version of Wright's ideal
solution, the John Hancock Building in Chicago contains
office space, apartments, restaurants, shops, and
athletic facilities. One can virtually live there with-
out leaving the building. The structurally efficient
Chicago frame was developed into a structurally more
efficient tube form articulated with cross-bracing,
initiating an "oil derrick" aesthetic. Unique in
their lofty location, the spectacular apartments are
the highest in the world. An upper level observatory
accommodates 500 people and provides an unparalleled
view of the city. But observers claim that they sense
they are viewing out of an "airship", they feel detached
from the civilization below. [18] For Tafuri such struc-
tures are part of the urban environment yet "refuse to
participate in it." In their detachment from the city
they communicate nothing but their "own surreal
presence". They are "antiurban paradoxes" because they

58. Chicago, the John
Hancock Building

harbor the conflicts of the metropolis within their
enclosure and negate the city itself in their attempt
to reject its irrationalities. He believes that at
least Wright's Mile High Skyscraper had an "internal

205

logic": it had condensed the city and coherently placed

it on the ideal landscape of Usonia. [19]

Some critics imply that because projects such as a
mile high tower were created during the last decade of
Wright's career when his "spontaneity had dwindled"
and was replaced by a "propensity towards intellectual
strain and a growing intensity in the propagation of
his views", they should be regarded as lacking serious
intent. [20] Though there is probably some truth in such
claims, as a utopian projection the Mile High Skyscraper
was for Wright an expedient design by which to verify
his attitudes on the aesthetic and technical potential
of the skyscraper, and to assert his unwillingness to
acknowledge its common association with the city and
the conditions that dictated its inception. Its level
of idealization is emphasized by its height, an impos-
sible one. As an unachievable solution it represented
two irreconcilable conditions: the social and environ-
mental context it demanded was completely foreign to
the notion of the skyscraper itself.
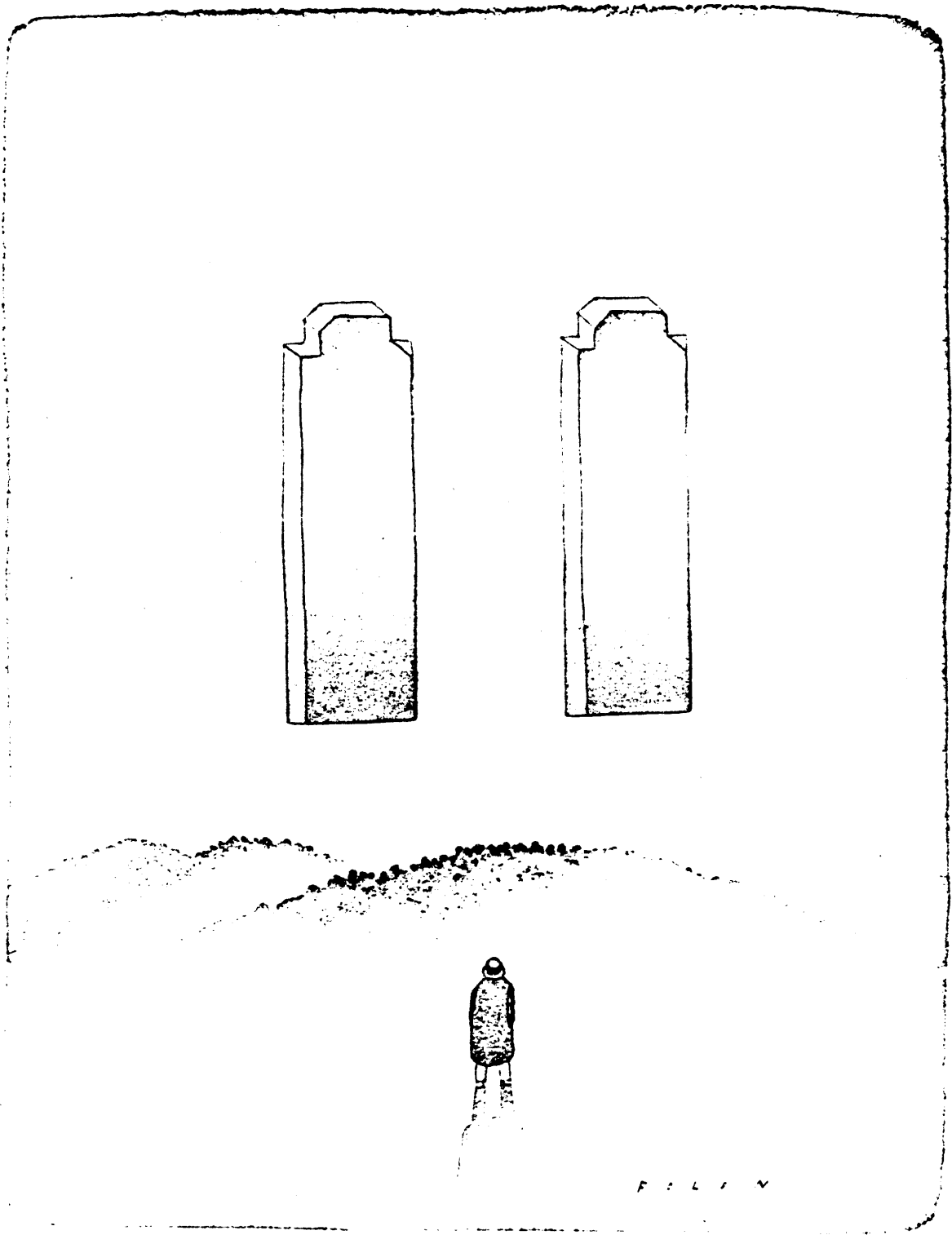
ANALYSIS

The meaning of the tower has been revealed in the previous arrangement of essays as a set of characteristics relating to the appearance of the tower, its function, and the purpose for its construction. Suspended in a larger contextual framework, meaning was defined, adapted, and reinforced by immediate historical and environmental influences. As frameworks shifted with place and time, some aspects of meaning appeared repeatedly across the transformations and emerged as themes. An examination of the themes and the interrelationships they reveal between given contextual frameworks will potentially provide a greater understanding of the towers themselves, their relationship to their framework and to other frameworks, and their relationship to the skyscraper of the present day. The themes of height, transparency, density, and agglomeration relate to the appearance of the tower and the themes of signaling, defense, and habitability relate to the function of the tower. The themes of ascension, viewing the earth, competition, legitimization, and civic landmark relate to the purpose behind tower building. Some towers have assumed an altered meaning independent of their original context or independent of any realistic context; such towers are myths or idealizations.

59. Jean-Michel Folon

APPEARANCE

The appearance of the tower refers to its outward aspect, its general visual impression, rather than to stylistic

209

peculiarities or attributes

HEIGHT

From the construction of the earliest towers to the
towers of the present day there has been a consistent
increase in vertical scale, a manifestation of the
universal tendency of tower builders to force available
technical limits. However, the inclination to achieve
an immense scale has occured, like the activity of tower
building, not continuously but sporadically throughout
historical time; the achievement of the highest tech-
nical expression could not be visualized unless it was
acceptable to a given context. The notion of accepti-
bility was initiated with Babel. As a myth it propagated
the lesson that such ardent, proud heaven storming was
in fact not acceptable, was morally unjustifiable unless
pursued for a purpose approved by God. But if the
Alexandrians knew of the myth, it was disregarded. The
Pharos was built three centuries later with the improved
technology of fired brick and was more than than 150
feet higher. The Gothic architects warranted their
pursuits with the belief that they were building an
artifact transcending earthly experience, in congruence
with contemporary conceptions regarding liturgy, mysti-
cism, scholasticism and a new understanding of the rela-
tionship between the individual, Jesus of Nazareth, and
God. Though the cathedral architects must have realized
in their approach to the ideal of soaring space and
structure that they were formulating a new aesthetic,
it was only in retrospect that their technique was truly
appreciated. In the era of romantic doubt, when the
realization of high structures was considered an appro-
priate means by which to evoke sublimity, to emphasize
the power of the natural environment and the smallness
of humanity, the quality of vastness in Gothic archi-

tecture was recalled in the first attempts at tower
building since the erection of the last Gothic spire,
such as the villa at Fonthill. The notion of sublimity
was not forgotten when the Eiffel Tower was designed,
but was de-emphasized in the face of the awe-inspiring
potential of new materials and fabrication techniques
and other more important considerations relating to
height, specifically nationalistic display of industrial
potential and technical achievement. In the early
attempts at designing a 1000-foot tower, engineers knew
they were testing the limit of a new building technology
just as the Babylonians, the Alexandrians, and the
Gothic architects had previously. The connection between
romanticism and vastness remained as the tower was rele-
gated to a pragmatic use. When construction density
created crevices for streets in New York, Hugh Ferriss
recognized the potential for the expression of sublime
attributes such as obscurity, infinity, power and, of
course, vastness and revived them in his drawings. J.
Carson Webster, discussing the characteristics of the
skyscraper, formulated a definition of "great height"
that referred to Burke's notion of the infinite: "How
many stories are necessary before it begins to seem
difficult to take in their number, so that they seem
numberless?" Current skyscraper building supports
vestiges of the notions of the sublime and the heroic;
some skyscrapers capture such impressions more readily
than others in the detail of their surface appearance
or the configuration of their interior. Constructors
still harbor the inclination to exploit technical limits,
though in recent skyscraper building such attemps have
become less common as towers have gained altitude because
of the existence of a delicate balance between attainment

211   of height and economic feasibility, or the ability of a

city to support or individuals to finance a structure
of considerable proportion.

TRANSPARENCY

Early towers were closed, dark and massive, expressive
on the initial approach to building with masonry and
stone. Babel lacked an interior. The Pharos at Alex-
andria was compartmentalized, but the small deep window
voids allowed little admittance of sunlight. Romanesque
towers were closed; the technical limits of stone con-
struction had not been tested because, like the Roman-
esque church, they were intended to acknowledge the
obscure and cryptic nature of the relationship between
the individual and the supramundane. The Gothic archi-
tects were the first to realize the virtues of trans-
parency, the quality that bathed the cathedral interior
in light and emphasized the suspended weightlessness
of structure. The openness of the spire and the cathe-
dral corresponded to a modification of the conception
of the Divine personality; religious art was to show
mystical truths in visible form. Perception required
light and consequently a voided structure. The Gothic
ideal was extended in the Eiffel Tower as the strength
to weight ratio of iron facilitated an unprecedented
expression of openness and clarity. The dramatically
altered appearance of the tower led Giedion to empha-
size it in the formulation of his interpretation of the
unprecedented multidimensional spatial experience that
was coincident with the development of modern archi-
tecture. Skyscrapers had to be open light-admitting
towers to be suitable for human occupany, but it is
also for this reason that protection from the external
environment had to be provided, meaning that habitable
towers will likely never rival the Eiffel Tower in
transparency.

DENSITY

The Pharos at Alexandria was the earliest tower of mag-
nificent scale to contain an internal system of circu-
lation and a series of floors; it anticipated the
internal organization of the skyscraper. The Round
Towers generally contained four floor levels that were
accessible by ladder. The stair was necessary for
reaching the bells in Romanesque towers as well as in
Gothic towers and spires. The tower at Fonthill had
an open interior; its stair was located adjacent to it
at lower levels and circulated around it near the top,
arriving at two lofty observation platforms. The
Eiffel Tower was an open structure supporting four
open floors. All of these towers were capable of sup-
porting more floor levels, but the economic conditions
that facilitated the birth of the skyscraper had to
create the demand for density, not only the addition
of floors, but also the heavy partitioning of space at
each floor level. Before towers of such density could
be inhabited on a regular basis, a convenient, effici-
ent means of vertical circulation, the elevator, had
to be invented. Before towers could support a dense
conglomeration of cubical spaces at lofty heights, an
appropriate structural system, most commonly the frame,
had to be developed and accepted.

AGGLOMERATION

Commonly found isolated, achieving independent promin-
ence in relationship to their surroundings, towers
assumed a clustered configuration when limited availa-
bility of land inside walls of medieval Italian towns
and the popularity of erecting a tower near houses led
to formation of groups of towers, often blocking sun-
light, inhibiting ventilation, encouraging local out-
breaks of battling. The need for regulation of such

213

construction was apparent but often unrealized in
attempts to restrict the lawlessness of the nobility.
Early skyscraper construction under conditions of res-
tricted land area or of high land value or both, gen-
erated a density of vertical construction that was
perhaps sublime, but not salubrious. Frank Lloyd
Wright referred to such dense conditions as "forests"
and preferred to see his towers stand as isolated trees
in a decentralized landscape such as Broadacre City:

> Has our country in the interval grown up
> to skyscraper status? No - the skyscraper
> takes a field trip of its own to a place
> where it belongs - in the country. I believe
> this type of structure, weighing but a
> fraction of Rockefeller Center structures,
> will become a "natural" everywhere in the
> United States.... 1

The loss of light and air led to the institution of
zoning regulations. Though often a futile effort in
Italian towns, they had a dramatic impact on the early
skylines of New York and Chicago, shown in the propor-
tion of towering structures in one city as opposed to
the other, and in New York, where the 1916 rule of the
"sky angle" led to the development of a new skyscraper
aesthetic, the setback block, dramatized in conceptual
form by Hugh Ferris.

FUNCTION

The function of the tower refers explicitly to its
pragmatic characteristics, to the use for which it
was adapted or constructed.

SIGNALING

The Pharos at Alexandria and other contemporary light-

houses represented the earliest constructions that
supported a signal, in this instance a flame for guiding
arriving seagoing vessels. The Round Towers also housed
a light, but it was instead primarily a warning beacon,
as were the bells, for signaling the arrival of invaders.
When bells came into wide ecclesiastical and civic use,
housing was required, and the increase in number and
scale of Romanesque towers was facilitated by this new
utilitarian demand. High placement of bells was impor-
tant not only for their effectiveness as a signal, but
also for their prominent display; in most cases, like
the tower, they were also a source of civic pride. As
the tower elongated into the spire and assumed a dema-
terialized, loftier appearance and a greater symbolic
role, its function as a signal tower was de-emphasized.
Renaissance and Baroque belfries returned to a lower
elevation where they assumed a functional but minor
position on the skyline in relationship to the dome.
The Eiffel Tower was not built as a signal tower, but
its unprecedented height along with the new availability
of electric light made the placement of a beacon on
high an exciting prospect. The light was not only a
signal, but also a spotlight; viewers had the ability
to control their nightime vista through choice of the
location where the light was aimed. A high location
was essential for the transmission of non-sensible
energy. Communications posts, the tallest structures
in existence today, were erected solely for this pur-
pose. Skyscrapers, simply because they are high, are
ideally suited for the support of such signaling
devices. The transmission of non-sensible energy is
continous, the association between the tower and the
signal is not apparent, its permeation and extent

215   invest it with greater efficacy than any signal of the
past.

DEFENSE

Two attributes of the early tower made it suitable for defensive purposes. First, as a closed, massive form it was protective and strong, an ideal fortification. Second, because it was high, it functioned well as a lookout station; it was a natural watchtower. The Round Towers offered security for clergy and church valuables during barbarian invasions and a protected vantage point for active defense, indicated by the high location of the first floor level and the retractable ladder. They were ideal observation stations for scanning the countryside for clues of approaching danger. The Romanesque bell tower had similar defensive functions. Defense towers had enjoyed a long, extensive use in the design of walled fortifications where they functioned as strong points in the curtain, and in defensive strategy blocked the path of the enemy along the length of the fortification wall. It was this long success that inspired the town nobility to adapt the tower form for a circumstantial need not unlike the one that promoted its orignal use. The defense tower was employed in later fortification design, but gradually fell into disuse when the theater of war expanded and advanced modes of warfare and strategic developments rendered major fortification design impracticable.

HABITABILITY

Early towers had varying degrees of habitability or capacity to support occupation for an extended duration of time. The sleeping chamber at the top of Babel had very restricted access. The Pharos at Alexandria contained spaces for offices, perhaps for research, and storage; openings for light and ventilation encouraged continual occupation, although the stair approach

was certainly arduous and time consuming. The Round
Towers were habitable for short periods of time; one
can assume that if warranted, as in periods of pro-
longed siege, the defender could safely spend a number
of days inside the towers although living conditions
were less than ideal. Some Romanesque towers contained
a similar floor structure, so they also could have
supported habitation. The medieval city fortresses
were habitable, though probably not on a permanent
basis. Spires and town hall towers were occupiable.
Eiffel had an apartment at the top of his tower, but
it could support only a limited number of people.
Unlike earlier towers, with the exception perhaps of
the Pharos at Alexandria, skyscrapers are occupiable for
extended periods of time, and in instances where they
contain apartments, for example the John Hancock Tower
in Chicago, they are habitable. The dense accommoda-
tion of occupants was beneficial to the bureaucratic
functioning of young corporate enterprise. The erec-
tion of a maximum number of floors on a delimited
urban land area was advantageous to financial specula-
tors. To enable such a large number of people to live
in a single tower necessitated the invention of the
frame, an open light-admitting support with the struc-
tural capacity to achieve unprecedented heights. For
access to offices and apartments, the development of
the elevator was crucial and coincident with the
notions of convenience and efficiency demanded in all
aspects of early enterprise. Additionally, existing
building services such as plumbing, heating, and elec-
tricity had to be improved and new support systems such
as air-conditioning had to be developed. Unlike towers
of the past, skyscrapers were extremely pragmatic, not

217   only because they represented a direct response to the

potential realization of economic advantage, but also
because of the overwhelming importance of the provision
of building systems to the comfort of the occupants.
Their direct or concealed manifestation in the appear-
ance of the tower provided it with a utilitarian image
that reinforced its pragmatic role.

PURPOSE

The purpose of the tower refers to the underlying non-
utilitarian motivations behind its creation, larger
considerations that are accessible, but tacit, and
resistent to precise definition.

ASCENSION

The earliest, most powerful, most explicit aspiration
towards heaven was, of course, the Tower of Babel. Here
the city of Babylon, represented by the priests, attemp-
ted to make a genuine connection with the ultimate
heaven, the absolute reality, with their gods. The
connection had already been made symbolically with the
terraced ziggurat. The anticipation and hope was to
transform such symbolism into reality through an ambi-
tious inflation of scale. Though as a myth Babel has
acquired broad and varied interpretation and meaning,
its fundamental purpose was its symbolic and antici-
pated role as a "stairway to heaven." The symbolism
of such an aspiration in later church building is more
complex. It is too facile to assume that the achieve-
ment of height in the expression of the spire was inten-
ded by cathedral builders to simply be a connection to
the heavenly realm. But although the end results rep-

resent a diverse set of influences, the impression of

such a connection is nevertheless powerfully conveyed
to the viewer of the present day. Initially the church
tower had the more pragmatic role of a bell-house,
stairway, watchtower, or defense fortification, with
the exception perhaps of Aix-la-Chapelle, where the
twin towers flanking the entrance carried connotations
of rulership. As the tower soared skywards and became
the Gothic spire, it gradually shed its utilitarian
character to assume a greater expressive role. In the
Renaissance dome, the imagery of the relationship
between earth and the celestial realm transformed. The
spatial experience of such a relationship becomes as
much an internal one as it is an external one, or the
view of a lofty monument on the skyline. Such a shift
in imagery was coincident with the inception of Humanism.
In Renaissance thought, the individual assumed a new
central importance. Forms such as the circle and the
sphere reflected a geometrical equilibrium where all
parts were harmonically related like the members of a
body. This human-created harmony was intended to echo
a universal, celestial harmony. It was expressed in
the cosmic interpretation of the dome, which represented
the sky, and had been common from antiquity onwards; it
was kept alive in the Eastern Church. The centralized,
internal space created by the dome established a verti-
cal axis that located a position where individuals could
establish themselves in relationship to the universe.
Humanist cosmology had relegated the tower to the
primative and authoritarian cosmology of the pyramid
and ziggurat because it seemed to dwarf the individual
and suggest struggling ascent. From this time onwards,
the tower lost the overwhelming significance it had in
establishing the symbolic connection between earth and
the supramundane, the heavenly realm. It would not

219

come back until the romanticists revived the notion of
the drama and power of nature, and once again doubted
the relative significance of the individual.

VIEWING THE EARTH

Certainly the top of the Pharos at Alexandria was a
fine observation point: the Round Towers were excellent
watchtowers, as were the Romanesque Towers; the towering
urban strongholds offered an unrivalled advantage for
watching the enemy, and if one dared to make the climb
to the top of the Strasbourg spire, the opportunity
for looking down on a random collection of medieval
roofs and jagged narrow streets was unparalleled. But
it was only when the awareness of human intrusion on
the landscape was heightened, with realization of per-
spective, extension into space and rationalization of
the landscape, as initially evidenced in Italian gar-
den design, that the view of the landscape achieved a
new importance. The earliest architectural manifes-
tation of control and extension into the landscape,
the Cortile del Belvedere, soon achieved prominence in
relationship of the Italian villa to its garden. The
belvedere, or high place from which rationalization and
control of the landscape could be instantly compre-
hended, became established for the first time as a
significant architectural feature. Wyatt's villa at
Fonthill provided an observation deck view of a rugged
"picturesque" landscape, though actually a designed one,
since great effort had been taken to insure its
appearance was wild, unruly, "untouched" by human
presence. Romantic doubt was again revealed in the
juxtaposition of the individual to the vast, "uncon-
trolled" natural environment. However, it was the
Eiffel Tower that dramatized the view. The prospect
220   was not only from on high, it was of Paris. Earlier

Victor Hugo had spoken of the view of the city from the
towers of Nortre Dame, but now city-viewing had achieved
its culmination; the view was a genuine public attrac-
tion, immediately accessible to everyone. It was ex-
tensive, and entirely unrestructed, the open structure
in its transparency and intersection with the distant
landscape provided a new spatial experience Giedion
later attempted to define. The vista was an artifact
created by human efforts, not a natural landscape, but
unlike the Renaissance and Baroque garden design it
was an uncontrolled, unclear order, a human chaos
revealed to previously uncomprehending eyes. After the
Eiffel Tower, any later skyscraper of significance
boasted a lofty observation deck.

COMPETITION

The struggle for prominence on the skyline was mani-
fested in three forms: as competition among individuals
in close proximity; as competition between cities,
states, or nations at larger distances, where towers
exist side by side only on paper on in the viewer's
memory; and as competition with the past, where current
designers or builders in their awareness of past exam-
ples made a major effort to exceed earlier achievements,
a desire inseparable from commensurate technical capa-
bilities. Competition among individuals was character-
istic of medieval Italian towns. In stronghold con-
struction, height was most commonly used for ostenta-
tion, though it offered the additional advantage of an
elevated position from which to look down on competi-
tors. Local political struggles left towers battle
scarred. Immediate competition also appeared among
civic landmarks, not a completely different phenomenon,
since these towers were often only extensions of an
individual such as the Podesta or the Popolo, repres-

enting a political faction, or of a group of individuals or "tower group". Destruction of the tower representing one group by another signified the victory of one institution or organization over another. For this reason towers such as these were often closely guarded in

times of war or civil conflict. In New York and other American cities, the competitive urge of one individual or a corporation to dominate another on the skyline has continued to the present day. Competition of this kind has often inspired deliberate trickery and deception by one party of another, the ploy of misrepresenting pro- posed height during the construction process to avoid being surpassed on the skyline by another tower under simultaneous construction is a common example. The advantage of looking down on competitors was revived when executives located their private offices, conference rooms and clubs on upper floors of skyscrapers to over- look the city and its multitudonous number of commer- cial pursuits that their enterprises dominated. Le Corbusier elucidated this phenomenon in a visit to New

York in the early 1930's:

> Thus, in the Middle Ages, at San Gimignano
> in Tuscany, the struggles for control among
> the families of the little city brought
> about the construction of fantastically
> high towers one after another, each one
> higher than the last, height indicated the
> triumph of one family and the crushing of
> another. San Gimignano has the appearance
> of a pincushion and the spectacle delights
> tourists while troubling common sense;
> hirsute beauty-yes, beauty, why not?...
> In New York, it is by a thousand feet of
> height that the game is played - the game
> of skyscrapers, the sport of skyscrapers.
> Those mad Americans, how they have enjoyed
> themselves! [2]

Competition between cities, states, nations, or towers
in distant locations had its beginnings with Babel and
Alexandria, where tower building became an extension
of civic pride; when judging the scale of the structures,
it becomes strikingly evident how these cities regarded
themselves and were regarded by other settlements. The
construction of town halls, the pride of cities such as
Siena, Florence, and Bruges, as well as campaniles and
cathedrals, was partially motivated by similar needs
to assert local esteem and to establish oneself in
relationship to surrounding cities. Despite the slow
realization by cathedral architects of the completed
structure, the notion of the possibility of achieving a
greater edifice than a neighboring city, perhaps a rival,
was always compelling. Perhaps it was the built asser-
tion of competitive spirit that facilitated the contem-
porary cult of Giantism. During the hiatus in tower
building of the Renaissance and Baroque periods, com-
petition between cities was diverted into other building
activities such as the creation of piazzas and squares.
The three places at Nancy, and the Circus at Bath; the
larger scale achievement of Sixtus V in Rome, where a
series of squares was connected with streets; and the
later boulevards of Hausmann represented a human
intervention in civic chaos that evidenced authority
and control. When building high structures became an
expression of technological potential, a source of
industrial pride, inseparable for Paris or London from
national pride, a competitive situation evolved where
one country attempted to duplicate the achievement of
another at a greater scale and on a higher rise of land,
a more magnificient Eiffel Tower. In early twentieth
century America, the skyscraper became a sign of econ-
omic viability and prestige. The greater the number of

skyscrapers a community possessed and the higher they
were was an indicator of mercantile activity and estab-
lished "worldly" importance. The aggregation of sky-
scrapers in Manhattan is the apotheosis of this notion:
to the world they are not only a symbol of New York,
but also of America.

Competition with the past became an objective as builders
became aware of previously constructed towers or of
history in general. It is perhaps an innate desire of
individuals or communities to achieve more than has been
accomplished by earlier civilizations through a daring
expression of new technical potential or acquired
skill. It is not without possibility that
the Alexandrians, who constructed a higher tower, knew
of Babel. There was an indirect, but an undeniable
progression in height from the earliest Romanesque
towers to the technical mastery of the Gothic spire.
The Gothic architects were certainly aware of earlier
construction and must have recognized their ability to
steadily lift the frame and the spire of the cathedral
higher as proof of their technical abilities. The
desire to gain height and display technical mastery
through tower building was de-emphasized through the
Renaissance where technical achievement and monumen-
tality was instead visualized in the dome. After the
Industrial Revolution, as new materials were developed,
a combined awareness of their new possibilities and of
the past instilled the desire in engineers to prove
their potential, as well as their own capabilities,
through the construction of a 1000-foot tower, or the
highest structure in the world. Initially financed by
private individuals or investors, structures expressive
solely of technical achievement became an exception in

tower building as their height was equalled and exceeded by land speculators and commercial enterprise. The desire to excel earlier established tower heights was intrinsic to early skyscraper construction.

LEGITIMIZATION

A recurring historical phenomenon, legitimization is the use of an architectural convention with a given set of associations by an individual or group either for establishing authority to a public audience or for justifying a powerful presence that is unquestionable in its dominance and well understood, but not particularly acceptable. The tower operates as an architectural convention on two levels: first, as a dominant architectural image it implies a ready association with authority; and second, because it is such a powerful image, it can accommodate a varied range of stylistic conventions that possess associations of their own. In the first instance, the tower has been an expedient resource thoughout history for the assertion of the sacred or secular power of an individual, group or institution. It disappeared as a monumental image during the Roman Empire and Romans relied instead upon the temple front and the dome for display of authority. Bell towers came to signify the dominance of the Church and town hall towers represented the importance of civic institutions; their inception corresponded with the challenge of sacred authority by secular authority. During the Baroque period, sovereign power relied on the palace at the end of a controlled vista as a sign of dominance, an anomalous gesture, when viewed from a distance the monumental facade disappeared into the horizon. The tower was not revived as a sign of political fortitude until the twentieth century where it was employed by

225

authoritarian regimes, for example, at the Fascist capi-
tal, the EUR, where it became a six-story prism filled
with simplified classical arches. Later examples, such
as the Albany Mall, with its forced grandiose scale and
featureless facades, represent the current abstract con-
ception of government, an image not unlike the one found
in many of the towers that support the bureaucratic
structure of contemporary business enterprise.

The earliest example of the second instance, the use of
the tower in combination with stylistic legitimization,
occurred in Charlemagne's Chapel at Aix-la-Chapelle.
By borrowing symbols of authority from Ravenna and
Rome, most importantly the twin-towered entrance way,
Charlemagne established his new position of power.
Until after its transformation into the Romanesque
twin-towered facade, the westwork embodied the complex
associations found in the united sovereignty of the
emperor and the Church. Fortification structures with
blocky massive walls, heavy squat articulating towers,
and various combinations of corbelling, crenellation
and machicolation, provided a well-defined set of
stylistic elements associated with the castles of the
land-owning nobility that could be employed individually
or in their totality for the purposes of creating an
image of authority, often with underlying associations
of brute power and frightfulness. Relied upon by the
town-based nobility for construction of urban strong-
holds, the expression meant almost what it had in the
countryside: pride in landownership, assertion of
concomitant power, and a willingness to defend both.
The convention was adopted for town halls in Volterra,
Florence and Siena. The Palazzo Vecchio's fearsome
aesthetic was counteracted with the use of ecclesias-
tical conventions, particularly the baldachino placed

above the battlements of the tower. When the cathedral
builders had developed a well defined ecclesiastical
style, it was adapted by Flemish builders and transformed
into the most highly evolved civic version of the Gothic
through the construction of prominent civic monuments
such as the belfry. As the highest tower in Bruges,
from its central location it assumed the role of the
Gothic cathedral in other medieval towns. The use of
an ecclesiastical expression as a symbol of commercial
success helped legitimize engagement in such worldly
pursuits by merchants and traders in a highly religious
society. The tower articulations found in fortification
architecture had an unusual persistence as conventional
images. They appeared again in the Renaissance at the
Villa d'Este and other contemporaneous projects initiated
as part of a papal building program where as authorita-
tive images they were used to signify the implementation
of a papal policy for creating a national Italian empire.
The Fonthill tower was very "public" despite its remote
location; it was discussed, written about, painted and
graphically illustrated. Here the Gothic expression
was not only used to achieve the appearance of sublimity,
but also for the purposes of tempering such a gesture
of ostentation, for making it publicly acceptable, for
moderating its impressive scale. The later application
of Gothic ornament on, at the time, the canonical steel
frame, was a method of attributing sacred connotations
to a social organization that was not in any respect
religious. Not unlike the belfry at Bruges in stylistic
intent, the Woolworth Building was carefully articulated
and refined in its artificial skin. A dominant gesture
on the skyline, the powerful organization behind its
creation necessitated legitimization, romantic attribu-
tions facilitated public acceptance and support. Such

227

associations led to speculation and congruences beyond architectural aesthetics that were difficult to define, comprehend, but not to recognize:

> What figure the poet might employ to describe
> the skyscraper, dwarfing the church, outpointing
> the cathedral spire, I do not know.... But
> the purpose of the skyscraper is not poetic.
> Perhaps commercialism is a new God, only too
> powerful and too appealing, to Whom men are
> building today their largest, costliest, and
> most laudatory structures. In this service
> they are building higher and higher, concen-
> trating more and more activity into less of
> ground space, stealing light and air from
> their neighbors, piously recording in their
> structures the exploitation that is
> [a] right-hand attribute of Commercialism.[3]

THE CIVIC LANDMARK

To be regarded as a landmark the tower must be representative of the city to outsiders, assume a dominant role in the urban fabric when seen from a distance, and be a source of civic pride. The Tower of Babel was one of the earliest landmarks. Though it can be assumed it was constructed primarily for religious purposes, it marked the location of Babylon on the horizon and was a great source of pride for Babylonians, an appropriate symbol for a city whose people believed they were at the center of the world, as suggested by the ceremony of climbing the ziggurat where the priests attained the "summit of the universe". More than a signpost and lighthouse, the Pharos at Alexandria, in its scale and grandeur dominated the shoreline near the city, it introduced and propagated the center of knowledge and wealth to arriving visitors. Inseparable from the city, the Gothic cathedral as the Heavenly Jerusalem was a city within a city, the nucleus of the town, it

228

was also its organic extension on the skyline. The
village was gathered about its base; its vertical domin-
ance was echoed by parochial church spires. It affirmed
civic viability. Rising above church spires, the
Bruges belfry was the equivalent image of the contem-
porary cathedral, it asserted the primacy of economic
pursuits and established the economic solidarity of the
town. Civic dignity during the Renaissance and Baroque
periods was asserted in building projects that displayed
human intervention in and control of the urban environ-
ment, such as the creation of squares and later streets
and boulevards. Symbols of local authority appeared in
the domes of churches such as St. Peter's in Rome or
the Cathedral in Florence and in the monumental palace
facades of princely mercantile families such as the Medici
or of the sovereign, as indicated at Versailles. Though
constructed by an individual, many of the private moti-
vations for designing the Eiffel Tower were coincident
with the spirit of a larger audience, despite protests.
Indisputable in its reign over the city, its meaning is
nevertheless highly complex. Its only ascertainable
characteristic is the strength of its attachment to its
environment; it cannot be severed from the Parisian
fabric. Though the Empire State Building denotes Man-
hattan to outsiders, and though, discounting the World
Trade Center, it is the highest tower in the city, it
loses significance in its location in a random mass of
competing towers. Instead the aggregation of towers
has become the civic symbol, an unforgettable one when
viewed at a distance or experienced through immediate
contact with shadowy canyon streets. Like the belfry
at Bruges, they stress the importance of economic
pursuits and help establish the economic viability of
Manhattan to the world. Verification of the strength

229

of this image lies in the attempted emulation of Manhattan by other American cities.

Detached from the Manhattan mass stands the twin-towered World Trade center. The highest set of structures in the city, inflated to a monstrous scale, they stand isolated, turned inwards in their refusal to acknowledge their urban surroundings. The critical linkage with the city has been broken; they are a dubious source of civic spirit or pride. Similarly the John Hancock Tower in Chicago is a foreign object; despite its domineering magnitude and its potential as a landmark, it hovers over the city and refuses to participate. As technological achievements and economic advantage encouraged increases in scale, skyscrapers climbed higher to gain an unrivalled position on the skyline. One would assume with such increased recognizability they would only be more magnificient landmarks. However the skyline has become so crowded that it is difficult to establish which tower is actually the dominant image. In the medieval town, problems of this kind were resolved simply through the dismantling of towers belonging to one group by another. New authority was immediately recognized from a distance. Though masses of towers have come to represent a city to outsiders in their dominance of the skyline, the sense of civic connection to such groupings or to individual towers has in many cases been weak or non-existent. The spirit of the "tower groups", campanilismo, and civic identification found in the towers of medieval towns has been undermined.

MYTH AND IDEALIZATION

The transformations of meaning described above referred
to the meaning of the tower to a given context. Yet it
is not unusual for towers to have acquired new associa-
tions outside of a given context, to have assumed a
dramatically altered meaning. This has occurred in
all cases to some extent, but certain towers have become
exceptionally powerful conceptual images, they transcend
their particular context, to become part of all contexts,
they have become virtually continuous as an idea across
time; such towers are myths. Towers that are only
abstract conceptions also demand an explanation, they
are unrealized dreams, often expressions of a powerful
idea, perhaps a utopia; such towers are idealizations.

MYTH

The greatest tower myth of all time is the myth of
Babel. As a material image transformed into a legend,
it has recurred in various contexts where it was first
understood as a historical incident with strong moral-
istic implications and later as a reference for any
undertaking of overambitious scale. It was an illumin-
ating resource for Goethe in his discussion of the
cathedral of Cologne; he viewed it as

> "The prototype of those gigantic conceptions
> straining upward to the skies in almost Baby-
> lonian fashion, so utterly out of proportion
> to the realistic means that its execution by
> necessity had to be interrupted." [4]

Later it was mentioned with the same implications in a
public outcry against the Eiffel Tower by artists,

painters, sculptors and architects, where it was pro-
tested

> with all our might in the name of slighted
> French taste against the erection, in the
> heart of our capital, of the useless and
> monstrous Eiffel Tower, which public ill-
> feeling, often inspired by good sense and
> the spirit of justice has already christened
> the Tower of Babel. [5]

The suggested congruence of the Tower of Babel with the
skyscraper was inspired by its features of daring scale
and by the moral implications in building so high out
of what has in some cases been considered arrogance and
pride. Frank Lloyd Wright believed the skyscraper had
exceeded the moral limit established by the myth of
Babel:

> Yes - these super-most solutions are seriously
> proposed to hold and handle landlord profits
> in a dull craze for verticality and vertigo
> that concentrates the citizen in an exaggerated
> super-concentration that would have shocked
> Babylon - and have made the tower of Babel
> itself fall down to the ground and worship. [6]

Montgomery Schuyler, referring to the towers of early
20th century New York, asked "What, if any, is the limit
of these new commercial Babels?" [7]

The Round Towers are mythical simply because of the
speculation generated by their primative origins and
mystical appearance. The campanile at Pisa, the Eiffel
Tower, and the Empire State building became myths as
they concurrently became increasingly popular as tourist
monuments. For Pisa, such status was far removed from
the original intent behind its construction, however

232

the Eiffel Tower, initially fabricated for an exhibition
that attracted a wide range of visitors, has essentially
retained its tourist status, though it is now another
kind of tourist monument with another set of popular
associations. By possessing such a status, both towers
have become so well connected with their location that
for the tourist they have come to represent the city.
When one sends a postcard of the Eiffel Tower, for
example, the receiver immediately makes the association
of Paris. When travelers visit Paris they immediately
expect to see the Tower in the cityscape. Because such
monuments have become important to visitors, they have
typically generated a series of dependent economic
activities and have helped support local businesses
that rapidly became reliant on a planned influx of
tourists. When it was established that the leaning
image of the campanile at Pisa was of economic value,
great efforts were taken not only to keep it from fall-
ing, but to maintain its leaning position. What would
have become of the Pisan tourist trade if consultants,
rather than raising the foundations of the tower so it
assumed an "appropriate lean", instead restored it to
an upright position? Consequently, the tower that has
become a myth in many cases has also become a tourist
site, a monument for distant travellers and sustenance
for a localized economy.

IDEALIZATION

Idealized towers may be the towers of dreams, as Bache-
lard refers to:

> And so our dreams attain boundless propor-
> tions ... at the end of countless, tortuous,
> narrow passages, the reader emerges in a
> tower. This is the ideal tower that haunts
> all dreamers of old houses: it is "perfectly

round" and there is "brief light" from
a "narrow window" ... [it] stretches from
earth to sky. It possesses the verticality
of the tower rising from the most earthly,
watery depths, to the abode of a soul that
believes in heaven. Such a house, constructed
by a writer, illustrates the verticality of
the human being. [8]

Few existing towers can rival such an imaginary tower,
but some come much closer than others to achieving the
vague, tacit concept of idealization. When describing
the Eiffel Tower, Roland Barthes spoke of the great
universal ascensional dream, or the "Babel complex" and
claimed that it touched even greater depths than those
associated with a theological project. The myth of
Babel is idealistic, if only because it has been under-
stood as a fantastic attempt to link the earth to the
sky, the common dream Eliade refers to, the stairway or
ladder to heaven, the passage from profane consciousness
to absolute reality. The cathedral spire carries ves-
tiges of such notions, attributions that only reinforce
its symbolic role. The Eiffel Tower has the ability to
attract a multitudonous number of meanings in a broad
spectrum, at a variety of levels. Such flexibility
makes it an accommodating image, readily adaptable to
personal, more specific idealistic conceptions of what
a tower should be. Frank Lloyd Wright's Mile High
Skyscraper is an idealized image because it represents
his perception of a utopia. Like Babel, it aims for
the clouds. It revived the connection with the supra-
mundane that disappeared after the construction of the
last cathedral spire. It is also overambitious, not
only in scale, but in its projection as an ideal city.
Proof of its idealization is that it can only exist as

a vision.

CONCLUSION

The transformations in meaning represented by themes
relating to purpose, appearance and function can provide
an illuminating understanding of the skyscraper of the
present day. The appearance of the skyscraper has dra-
matically shifted in relationship to the appearance of
towers of the past. Not only is it the highest, but
also, with the exception of the Eiffel Tower, the most
open tower. Internal density, often indicated on the
exterior by the regulated placement of windows, is un-
rivalled by past towers. Urban agglomeration, or the
condition that leads to the inability of the viewer to
acknowledge a singular tower image on the skyline,
occurred in medieval Italian towns, but the condition
was an exceptional, transitory occurrence; few of these
towers remain in existence today. Such a major change
in appearance partially accounts for the change in mean-
ing of the skyscraper.

The inclination towards tower building, when considered
acceptable by a given milieu, can be attributed to both
function and purpose. By denoting a common use, function
can establish meaning, but it is purpose that provides
richness and depth of meaning. Purpose considers charac-
teristics common to human nature and focuses on their
manifestation in the activity of tower building. Begin-
ning with the construction of the first towers, varying
emphasis has been placed on characteristics of meaning
relating to purpose and function, and in all cases the
motivation for tower building can be explained by either
set of characteristics and in most cases varying degrees
of both. Earlier towers designed for specific practical

235

uses, such as signaling and defense, often were constructed with consideration of larger purposes or acquired additional purposes with the passage of time; in this way their utilitarian value was de-emphasized. Though the Pharos at Alexandria was constructed as a fire beacon, it was also an exercise in attaining unprecedented height and a civic landmark that acquired later meaning as a symbol of a seaport. The Round Tower was designed specifically as a bell-house and defensive fortification, but its appearance and its role as a symbol of the Church were not accidental and just as important as pragmatic considerations. Romanesque campaniles had similar functions though, as shown at Pisa and at St. Mark's in Venice, where the campaniles played a critical role in the image of the city, landmark considerations demanded much greater attention than utilitarian concerns. The Gothic spire became almost useless as its symbolic or role as both an extension of the cathedral and the city increased. The tower at Fonthill was impractical regardless of its purpose as an observation platform. The Eiffel Tower was also useless, despite Eiffel's attempts to convert it to a functional structure after its construction. It was certainly not designed as a site for drop tests, or for testing physiological responses to height, or for supporting weather equipment. But the skyscraper is indubitably the most utilitarian of all towers. A direct response to the need for a larger amount of space on limited land area, the frame virtually instantly created space in urban locations where it was in highest demand. The characteristic of habitability reinforces the utilitarian image of commercial towers. Any structures that support human occupation for extended periods of time must be functional. Based on economic advantage, they

236

embody the implications that accompany the attitude behind the generation of the maximum amount of usable space for a given dollar value. Useful attributions such as these were blatantly evidenced in the Reliance Building.

However, many skyscrapers have displayed some of the characteristics of purpose and appearance intrinsic to earlier tower building during construction or have assumed these characteristics after completion. Though attention to characteristics of purpose and appearance have generally been subordinated to the pervasive demands of economic advantage, it is only when one realizes that tower building can mean more than the most efficient response to a given set of context-related conditions that the skyscraper begins to assume some of the meaning common to tower building of the past. The more cogently one of these characteristics is manifested, or the greater their number, the greater the depth and clarity of meaning the skyscraper assumes. If the exterior appearance of the skyscraper is sublime, if its interior is partially voided or transparent, its utilitarian quality is undermined, it becomes more like a "tower" in the sense that it possesses some of the qualities found originally and repeatedly in earlier towers. If a skyscraper becomes a marker in a competitive display, an observation platform, a landmark, or the framework for a skin that evokes associations with past towers and therefore associations with an established meaning, it becomes identified with traits that represent the essence of tower building. The Woolworth Building was constructed to meet utilitarian demands, but it also was part of the skyline competition in Manhattan and it legitimized the forces behind its construction with the sacred connotations of its skin. The soaring

237

delineation of its structure evoked the sublime. The
Empire State Building was not only a winner in the sky-
line competition, but its streamlined Art Deco surfacing
was advantageous to public acknowledgement and accept-
ability. It is a civic landmark, a symbol of Manhattan
and has one of the loftiest observation decks in the
city. When the skyscraper assumes context independent
mythical or idealistic qualities, it can rival the
meaning of towers of the past. The Empire State Build-
ing has become a popular myth because of its powerful
conceptual image based on height and landmark status;
the myth has been reinforced through popular media such
as the postcard and the cinema. The Mile High Skyscraper
was idealistic, because like Babel it aspired towards the
ethereal, a seductive but impossible vision. Conse-
quently, the overwhelming utilitarian emphasis of
the skyscraper and its dramatically altered appearance
invest it with a meaning that represents the most dra-
matic disjunction in the set of historical images that
fall under the rubric "tower". It is only when it
assumes characteristics of purpose and appearance with
associations that are intrinsic to all tower building,
characteristics established by their repeated occurrence
during earlier historical frameworks, that it becomes
first an acceptable image and perhaps, if warranted,
transcends the condition of social fitness to enter
the realm of the significant and the meaningful.

FOOTNOTES

INTRODUCTION

1. Joseph Gwilt, An Encyclopedia of Architecture,
     Historial, Theoretical and Practical, 2nd ed.
     (London: Lomgman, Brown, Green and Longmans,
     1951), p. 1047.

2. Russell Sturgis, A Dictionary of Architecture and
     Building: Biographical, Historial, Descriptive
     (London: Macmillan and Co., Ltd., 1902), p. 835.

3. Webster's Third International New Dictionary, 14th
     ed. (Springfield, Mass.: G.C. Merriam Co.,
     1966), p. 2418.

BABEL

1. André Parrot, The Tower of Babel, trans. Edwin
     Hudson (New York: Philosophical Library, 1955)
     p. 18.

2. Ibid., p. 22.

3. Mircea Eliade, Images and Symbols: Studies in
     Religious Symbolism (New York: Sheed and Ward,
     1969), p. 45.

4. René Taylor, "Hermetism and Mystical Architecture
     in the Society of Jesus," in Baroque Art: The
     Jesuit Contribution, ed. Rudolf Wittkower and
     Irma B. Jaffe (New York: Fordham University
     Press, 1972), pp. 81-88.

5. Parrot, Babel, pp. 65-68.

6. Wolf Schneider, Babylon is Everywhere, trans. Inge-
     borg Sammet and John Oldenburg (New York: Mc-Graw
     Hill Book Co., Inc., 1960), p. 182

7. Joseph Harriss, <u>The Tallest Tower</u> (Boston: Houghton Mifflin Company, 1975), p. 20.

8. Montgomery Schuyler, "The Evolution of the Sky-scraper," in <u>American Architecture and Other Writings</u>, ed. William H. Jordy and Ralph Coe New York: Atheneum, 1964), p. 214.

ALEXANDRIA: THE PHAROS

1. Giorgio Cavaglieri, "Outline for a History of City Planning from Prehistory to the Fall of the Roman Empire," <u>Society of Architectural Historians Journal</u> 8:1-2, p. 53.

2. Douglas B. Hague and Rosemary Christie, <u>Lighthouses: Their Architecture, History and Archeology</u> (Llandysul, Wales: Gomer Press, 1975), p. 63.

3. Ibid., p. 3.

4. Ibid., p. 4.

5. Ibid., p. 63.

ROUND TOWERS

1. Kenneth John Conant, <u>Carolingian and Romanesque Architecture</u> (Baltimore: Penguin Books, 1959), p. 301.

2. Ibid., p. 9

3. Margaret Stokes, <u>Early Christian Art in Ireland</u> (Covent Garden: Chapman and Hall, Ltd., 1887), p. 172.

4. Arthur C. Champneys, <u>Irish Ecclesiastical Architecture</u>, 2nd ed. (New York: Hacker Art Books, 1970), p. 49-53.

AIX-LA-CHAPELLE: THE WESTWORK

1. Joseph Rykwert, <u>Church Building</u> (New York: Harry N. Abrams, Inc., 1974), p. 66

2. Howard Saalman, <u>Medieval Architecture</u> (New York: George Braziller, 1962), p. 22.

3. Saalman, <u>Medieval Architecture</u>, p. 21.

4. Rykwert, <u>Church Building</u>, p. 70.

5. Saalman, <u>Medieval Architecture</u>, p. 20.

6. Kenneth John Conant, <u>Carolingian and Romanesque Architecture</u> (Baltimore: Penguin Books, 1959), p. 54.

7. Richard Krautheimer, <u>Early Christian and Byzantine Architecture</u> (Baltimore: Penguin Books, 1965), p. 115.

8. Conant, <u>Carolingian and Romanesque</u>, p. 9.

9. Ibid., p. 295.

10. Ibid., p. 54.

11. Ibid., pp. 69-70.

12. Saalman, <u>Medieval Architecture</u>, p. 26.

13. Hans Erich Kubach, <u>Romanesque Architecture</u> (New York: Harry N. Abrams, Inc., 1975), p. 67.

14. Warren Sanderson, "The Sources and Significance of the Ottonian Church of Saint Pantaleon at Cologne, <u>Society of Architectural Historians Journal</u> 20:2:96.

PISA: THE CAMPANILE

1. Kenneth John Conant, <u>Carolingian and Romanesque Architecture</u> (Baltimore: Penguin Books, 1959), pp. 229-32.

2. Janet Ross and Nelly Erichsen, <u>The Story of Pisa</u> (Nendeln: Kraus-Thomson OrganizationLtd., 1970) pp. 191-95.

3. Conant, <u>Carolingian and Romanesque</u>, p. 239.

4. Marvin Trachtenberg, <u>The Campanile of Florence Cathedral</u> (New York: New York University Press, 1971), p. 158.

5. Conant, <u>Carolingian and Romanesque</u>, p. 239.

6. John Ruskin, <u>The Seven Lamps of Architecture</u> (New York: Noonday Press, 1961), p. 152.

7. W.H. Goodyear, "The Leaning Tower of Pisa," <u>Architectural Record</u>, January-March 1898, p. 262.

8. Janet Ross and Nelly Erichsen, <u>The Story of Pisa</u> (Nendeln: Kraus-Thomson Organization Ltd., 1970), p. 189.

9. Daniel Waley, <u>Italian City Republics</u> (New York: McGraw Hill, 1969), p. 159.

CITY FORTRESSES

1. Daniel Waley, <u>Italian City Republics</u> (New York: McGraw-Hill, 1969), p. 12.

2. Ibid., p. 164.

3. Ibid.

4. Ibid., p. 170.

5. Ibid.

6. Quentin Hughes, <u>Military Architecture</u> (New York: St. Martin's Press, 1974), pp. 32-59.

7. Marvin Trachtenberg, <u>The Campanile of the Florence Cathedral</u> (New York: New YOrk University Press), p. 166.

8. Waley, <u>Italian City Republics</u>, p. 176.

9. Ibid.

10. Richard Krautheimer, <u>Rome: Profile of a City: 312-1308</u> (Princeton N.J.: Princeton University Press, 1980), pp. 303-19.

11. Ibid., p. 319.

12. Janet Ross and Nelly Erichsen, <u>The Story of Pisa.</u> (Nendeln: Kraus-Thomson Organization Limited, 1970), p. 129.

13. Ibid., pp. 126-30.

14. Althea Wiel, The Story of Bologna (Nendeln: Kraus-Thompson Organization Limited, 1970), p. 151.

15. Dante Alighieri, Inferno xxxi, 136-139, as quoted in Ross, Pisa, p. 189.

16. Johann Wolfgang von Goethe, "Italian Journey", as quoted in W.H. Goodyear, "The Leaning Tower of Pisa", Architectural Record, January-March 1898, p. 291.

17. Marvin Trachtenberg, Campanile, p. 165.

18. Waley, Italian City Republics, p. 207.

19. Edmund G. Gardner, The Story of Siena and San Gimignano (Nendeln: Kraus-Thomson Organization Limited, 1971), pp. 336-355.

FLORENCE: PALAZZO VECCHIO

1. Daniel Waley, The Italian City Republics (New York: McGraw Hill, 1969), p. 7.

2. Paul Frankl, Gothic Architecture (Baltimore: Penguin Books, 1962), p. 250.

3. Waley, Italian City Republics, p. 151.

4. W. Braunfels, Mittelalterliche Stadtbaukunst in der Toskana, p. 26, as cited in Marvin Trachtenberg, The Campanile of the Florence Cathedral (New York: New York University Press, 1971), p.167).

5. Trachtenberg, Campanile, p. 167-69.

6. John Ruskin, The Seven Lamps of Architecture (New York: The Noonday Press, 1961), p. 75.

7. Trachtenberg, Campanile, pp. 169-71.

8. Ibid, pp. 174-78.

9. Lewis Mumford, The City in History (New York: Harcourt, Brace and World, Inc., 1961), p. 273.

10. Trachtenberg, _Campanile_, p. 179.

11. Ibid.

12. Ibid., p. 162.

BRUGES: THE BELFRY

1. Fritz Rorig, _The Medieval Town_ (Berkeley: University of California Press, 1971), p. 73.

2. Ibid.

3. Ibid., p. 76.

4. Arthur Stratton, "The Architecture of Bruges", _Architectural Review_ 42 (July-December 1917): 115.

5. Ibid., p. 112.

6. Paul Fankl, _Gothic Architecture_ (Baltimore: Penguin Books, 1962), p. 246.

7. Lewis Mumford, _The City in History_ (New York: Harcourt, Brace and World, Inc., 1961), p. 273.

STRASBOURG: THE SPIRE

1. Fritz Rorig, _The Medieval Town_ (Berkeley: University of California Press, 1971), pp. 21-26.

2. Howard Sallman, _Medieval Architecture_ (New York George Braziller, 1962), pp. 39-40.

3. Revelation 21: 1,2.

4. Laurence Hull Stookey, "The Gothic Cathedral as the Heavenly Jerusalem: Liturgical and Theological Sources," _Gesta_ 8 (1969): 39.

5. Durandus, _The Symbolism of the Churches_, as quoted in Stookey, "The Gothic Cathedral," p. 38.

6. Erwin Panofsky, _Early Netherlandish Painting: Its Origins and Character_ (Cambridge: Harvard University Press, 1953), p. 186.

7. Norris Kelly Smith, "Crisis in Jerusalem," in _Late Entries to the Chicago Tribune Tower Competition_, ed. Stanley Tigerman (New York: Rizzoli, 1980), p. 106.

8. Hans Jantzen, _High Gothic_, trans. James Palmes (New York: Pantheon Books, 1962), p. 179.

9. Alex Boethius and J.B. Ward-Perkins, _Etruscan and Roman Architecture_ (Baltimore: Penguin Books, 1970), p. 405.

10. Jantzen, _High Gothic_, p. 100.

11. Ibid.

12. Erwin Panofsky, _Gothic Architecture and Scholasticism_ (New York: Meridian Books, 1957), pp. 60-64.

13. Frankl, _Gothic Architecture_, p. 241.

14. Ibid., p. 184.

15. Ibid., p. 131.

16. Ibid., p. 184.

17. Ibid.

18. Paul Frankl, _The Gothic_ (Princeton, N.J.: Princeton University Press, 1960), p. 250.

19. Ibid., p. 246.

20. Ibid., p. 249.

21. Ibid., p. 250.

22. Ibid., Laugier, Essai sur l'architecture, as quoted in Frankl, _The Gothic_, p. 401.

23. Frankl, The Gothic, p. 417.

24. Johann Wolfgang von Goethe, trans Geoffry Grigson, _Architectural Review_ 98, as quoted in Nikolaus Pevsner, _Outline of European Architecture_, 7th ed. (Baltimore: Penguin Books, 1963), p. 360.

25. Auguste Rodin, _Cathedrals of France_, trans. Elisabeth Geissbuhler (Boston: Beacon Press, 1965), p. 137.

245

26. Ibid., p. 194.

27. Jantzen, <u>High Gothic</u>, p. 180.

<u>VILLA D'ESTE</u>

1. Leonardo Benevelo, <u>The Architecture of the Renais-
   sance</u>, 2 vols. (Boulder, Colo.: Westview Press,
   1978), p. 722.

2. Edith Wharton, <u>Italian Villas and their Gardens</u>
   (New York: The Century Co., 1904), p. 139.

3. Ibid.

4. Stanilaus van Moos, "The Palace as Fortress: Rome
   and Bologna under Pope Julius II," in <u>Art and
   Architecture in the Service of Politics</u>, edited
   by Henry A. Millon and Linda Nochlin (Cambridge:
   MIT Press, 1978), p. 47.

5. James Ackerman, <u>The Cortile del Belvedere</u> (Biblio-
   teca Apostolica Vaticana, 1954), p. 16.

6. Ibid., p. 140.

7. Moos, "Palace as Fortress", p. 70.

8. Ibid., p. 46.

9. Ibid., p. 74.

10. James S. Ackerman, <u>Palladio</u> (Baltimore: Penguin
    Books, 1966), pp. 61-75.

<u>FONTHILL ABBEY</u>

1. H.A.N. Brockman, "Fonthill Abbey", <u>Architectural
   Review</u> 95 (June 1944): 149.

2. James Lees-Milne, <u>William Beckford</u> (Great Britain;
   Compton Russell Ltd., 1976), p. 42.

3. Ibid.

4. Ibid.

246

5. Ibid., p. 43.

6. Ibid., p. 49

7. Uvedale Price, Essays on the Picturesque, as quoted in Lees-Milne, William Beckford, p. 58.

8. John Britton, Graphical and Literary Illustrations of Fonthill Abbey (London: Burton Cottage, Burton Street, 1823), p. 31.

9. Brockman, "Fonthill Abbey", p. 153.

10. Britton, Graphical and Literary Illustrations, p. 34.

11. Peter Collins, Changing Ideals in Modern Architecture (Montreal: McGill University Press, 1965), p. 44.

12. Ibid., p. 49.

13. Christopher Hussey, The Picturesque (London: Frank Cass and Co., Ltd., 1927), p. 59.

14. Collins, Changing Ideals, p. 48.

15. Hussey, Picturesque, p. 59.

16. John Ruskin, The Seven Lamps of Architecture (New York: The Noonday Press, 1961), p. 73.

17. Hussey, Picturesque, p. 197.

18. Lees-Milne, William Beckford, p. 76.

19. Brockman, "Fonthill Abbey", p. 155.

20. Paul Frankl, The Gothic (Princeton N.J.: Princeton University Press, 1960), p. 553.

21. S. Lang, "The Principles of the Gothic Revival in England", Journal of the Society of Architectural Historians 25:4: 253.

PARIS: EIFFEL TOWER

1. Joseph Harriss, <u>The Tallest Tower</u> (Boston: Houghton Mifflin Company, 1975), p. 5.

2. David P. Billington, <u>Structures and the Urban Environment</u> (Princeton, N.J.: Department of Civil Engineering, Princeton University, 1978), p. 9.

3. Anne Radcliffe, <u>Gaston de Blondeville</u>, Vol. 1, p. 98, as quoted in Frank I. Jenkins, "Harbingers of Eiffel's Tower," <u>Society of Architectural Historians Journal</u> 16:4:22.

4. Ibid.

5. John Ruskin, Lectures on Architecture and Painting Delivered at Edinburgh in November 1853, as quoted in Jenkins, "Harbingers of Eiffel's Tower," p. 22.

6. Jenkins, "Harbingers of Eiffel's Tower," p. 25.

7. Ibid.

8. Ibid., p. 26.

9. Ibid., p. 27.

10. Harriss, <u>Tallest Tower</u>, p. 16.

11. Ibid., p. 11.

12. Ibid., p. 69.

13. Ibid., p. 85.

14. Sigfried Giedion, <u>Space, Time and Architecture</u> (Cambridge: Harvard University Press, 1941), p. 281.

15. Harriss, <u>Tallest Tower</u>, p. 92.

16. Billington, <u>Structures</u>, p. 15.

17. Ibid., p. 7.

18. Giedion, <u>Space, Time and Architecture</u>, p. 284.

19. Gustav Eiffel, "Les Grandes Constructions Metall-
    iques," as quoted in Billington, Structures,
    p. 11.

20. J.M. Richards, "A Tower for London," Architectural
    Review (November 1940): 141.

21. Ibid., p. 143-4.

22. Leonardo Benevelo, History of Modern Architecture,
    trans. H.J. Landry, 2 vols., 3rd ed. (Cambridge:
    M.I.T. Press, 1971), p. 113.

23. Harriss, Tallest Tower, p. 212.

24. Roland Barthes, The Eiffel Tower and Other Mytho-
    logies, trans. Richard Howard (Toronto: Mc Graw-
    Hill Ryerson Ltd., 1979), pp. 3-5.

25. Ibid., pp. 5-6.

26. Ibid., p. 7.

27. Ibid., p. 17

CHICAGO: THE RELIANCE BUILDING

1. Winston Weisman, "New York and the Problem of the
   First Skyscraper," Society of Architectural
   Historians Journal 12:1: 19.

2. Colin Rowe, "Chicago Frame", in The Mathmatics
   of the Ideal Villa and Other Essays (Cambridge:
   MIT Press, 1976), p. 102.

3. Weisman, "New York", p. 19.

4. Leonardo Benevelo, History of Modern Architecture,
   trans. H.J. Landry, 2 Vols., 3rd ed. (Cambridge:
   MIT Press, 1966), p. 228.

5. Sigfried Giedion, Space, Time and Architecture
   (Cambridge: Harvard University Press, 1941),
   p. 385.

6. Carl W. Condit, The Chicago School of Architecture
   (Chicago: The University of Chicago Press, 1964),
   p. 109-11.

7. Benevelo, _History of Modern Architecture_, p. 228.

8. Rowe, "Chicago Frame", p. 91.

9. Montgomery Schuyler, "D.H. Burnham", in _American Architecture and Other Writings_, ed. William H. Jordy and Ralph Coe (New York: Atheneum, 1964), p. 196-99.

10. Montgomery Schuyler, "Architecture in Chicago: Adler and Sullivan," in _American Architecture and Other Writings_, ed. William H. Jordy and Ralph Coe (New York: Atheneum, 1964), p. 180.

11. Ibid., p. 182.

12. Frank Lloyd Wright, "The Art and Craft of the Machine", in _Frank Lloyd Wright: Writings and Buildings_, ed. Edgar Kaufmann (New York: Meridian Books, 1960), p. 60.

13. Rowe, "Chicago Frame", p. 90.

14. Benevelo, _History of Modern Architecture_, p. 238.

15. Ibid.

16. Ibid., p. 234-5.

17. Louis Sullivan, "The Tall Office Building Artisti-Considered", in _Kindergarten Chats and Other Writings_ (New York: Wittenborn, Schultz, Inc., 1947), p. 203.

18. Ibid.

19. Lewis Mumford, _The Brown Decades_ (New York: Dover Publications, Inc., 1931), p. 138.

20. Ibid., p. 153.

21. J. Carson Webster, "The Skyscraper: Logical and Historical Considerations", _Society of Architectural Historians Journal_ 12:1: 13-21.

22. Gaston Bachelard, _The Poetics of Space_, trans. Maria Jolas (Boston: Beacon Press, 1969), p. 24.

23. Ibid., p. 27.

24. Mumford, _Brown Decades_, p. 138.

25. Giedion, Space, Time and Architecture, p. 385-88.

26. Rowe, "Chicago Frame", p. 106.

27. Ludwig Mies van der Rohe, "Working Theses", in Programs and Manifestoes on 20th Century Architecture, ed. Ulrich Conrads (Cambridge: MIT Press, 1970), p. 74.

28. Frank Lloyd Wright, "Skyscraping", in Frank Lloyd Wright on Architecture, ed. Frederick Gutheim (New York: Duell, Sloan and Pearce, 1941), p. 200.

NEW YORK: THE EMPIRE STATE
AND WOOLWORTH BUILDINGS

1. John Burchard and Albert Bush Brown, The Architecture of America: A Social and Cultural History (Boston: Little, Brown and Comapny, 1961), p. 241.

2. "A Pacific Coast Skyscraper," Architectural Record, May 1911, p. 407.

3. Vincent Scully, American Architecture and Urbanism (New York: Praeger Publishers, 1969), p. 144.

4. Winston Weisman, "New York and the Problem of the First Skyscraper," Society of Architectural Historians Journal 18:4:19.

5. Montgomery Schuyler, "The Towers of Manhattan," Architectural Record, February 1913, p. 99.

6. Edwin A. Cochran, The Cathedral of Commerce (New York: Broadway Park Place Co., 1916).

7. Manfredo Tafuri, "The Disenchanted Mountain: The Skyscraper and the City", in The American City, ed. Giorgio Ciucci, Francesco Dal Co, Mario Manieri-Elia, Manfredo Tafuri (Cambridge: MIT Press, 1979), p. 390.

8. S. Parkes Cadman, "Foreward", in The Cathedral of Commerce.

9. Schuyler, "The Towers of Manhattan", p. 108.

10. Montgomery Schuyler, "The Towers of Manhattan," _Architectural Record_, February 1913, p. 99.

11. Hugh Ferriss, _The Metropolis of Tommorrow_ (New York: Ives Washburn, 1929), p. 62.

12. Jean Gottman and Robert A. Harper, _Metropolis on the Move: Geographers Look at Urban Sprawl_ (New York: John Wiley and Sons, Inc. 1967), p. 138.

13. Scully, _American Architecture_, p. 144.

14. Manfredo Tafuri, "The Disenchanted Mountain: The Skyscraper and theCity," p. 448.

15. William H. Jordy, _American Buildings and their Architects, Vol. 4: The Impact of European Modernism in the Mid-Twentieth Century_, p. 65, cited by Tafuri, "Disenchanted Mountain", p. 448.

16. Ferris, _Metropolis_, p. 62.

17. Cervin Robinson and Rosemarie Haag Bletter, _Skyscraper Style_ (New York: Oxford University Press, 1975), pp. 35-40.

18. Ibid., pp. 67-71.

19. Theodore James, _The Empire State Building_ (New York: Harper and Row, 1975), pp. 51-57.

20. Tafuri, "Disenchanted Mountain," p. 432.

21. Alfred Bossom, _Building to the Skies: The Romance of the Skyscraper_ (New York: The Studio Publications, 1934), p. 136.

22. James, _The Empire State Building_, p. 72.

23. Hayden, "Skyscraper Seduction," p. 109.

24. Mike Cherry, _On High Steel: The Education of an Ironworker_ (New York: Quadrange/The New York Times Book Co.), pp. 86-87.

25. Hayden, "Skyscraper Seduction," p. 111.

26. James, _The Empire State Building_, p. 133.

27. Tafuri, "The Disenchanted Mountain," p. 503.

28. Diana Agrest, "Architectural Anagrams: The Symbolic Performance of Skyscrapers", <u>Oppositions</u> 11 (Winter 1977): 32.

29. Scully, <u>American Architecture</u>, p. 144.

FRANK LLOYD WRIGHT: MILE HIGH SKYSCRAPER

1. Frank Lloyd Wright, "The Art and Craft of the Machine", in <u>Frank Lloyd Wright: Writings and Buildings</u>, ed. Edgar Kaufmann and Ben Raeburn (New York: Meridian Books, 1960), p. 60.

2. Ibid., p. 61.

3. Frank Lloyd Wright, "Chicago Culture", in <u>Frank Lloyd Wright on Architecture</u>, ed. Frederick Gutheim (New York: Buell, Sloan and Pearce, 1941), p. 88.

4. Frank Lloyd Wright, <u>An American Architecture</u>, ed. Edgar Kaufmann (New York: Bramhall House, 1955), p. 116.

5. Frank Lloyd Wright, "Experimenting with Human Lives", in <u>Frank Lloyd Wright on Architecture</u>, p. 99.

6. Frank Lloyd Wright, <u>The Story of the Tower: The Tree that Escaped the Forest</u> (New York: Horizon Press, 1956), p. 14.

7. Colin Rowe, "Chicago Frame", in <u>The Mathmatics of the Ideal Villa and Other Essays</u> (Cambridge: MIT Press, 1976), p. 94.

8. Wright, <u>The Story of the Tower</u>, p. 34.

9. Giorgio Ciucci, "The City in Agrarian Ideology and Frank Lloyd Wright: Origins and Development of Broadacres," in <u>The American City</u>, ed. Giorgio Ciucci, Francesco Dal Co, Manieri-Elia, Manfredo Tafuri (Cambridge: MIT Press, 1979), p. 367.

10. Ibid.

11. Frank Lloyd Wright, <u>An Autobiography</u> (London: Longmans, Green and Company, 1933), p. 327.

12. Frank Lloyd Wright, "The Tyranny of the Skyscraper,"
    in The Future of Architecure (New York: Horizon
    Press, 1953), p. 152.

13. Frank Lloyd Wright, The Living City (New York:
    Meridian, 1970), p. 59.

14. Wright, "The Art and Craft of the Machine", p. 73.

15. Wright, "The Tyranny of the Skyscraper," p. 157.

16. Frank Lloyd Wright, "American Architecture Today",
    in Frank Lloyd Wright on Architecture, p. 149.

17. Wright, An American Architecture, p. 126.

18. "The Tall One", Forum, July-August 1970, p. 44.

19. Manfredo Tafuri, "The Disenchanted Mountain: The
    Skyscraper and the City," in The American City.

20. Leonardo Benevelo, History of Modern Architecture,
    trans. J.H. Landry, 2 vols., 3rd ed. (Cambridge:
    MIT Press, 1971), p. 650.

CONCLUSION

1. Frank Lloyd Wright, The Story of the Tower: The
   Tree that Escaped the Forest (New York: Horizon
   Press, 1956), p. 19.

2. Charles Edouard Jeanneret-Gris, When the Cathedrals
   were White (New York: Reynal and Hitchcock, 1947),
   p. 56.

3. Sheldon Cheny, The New World Architecture, p. 120,
   as quoted in Cervin Robinson and Rosemarie Haag
   Bletter, Skyscraper Style (New York: Oxford
   University Press, 1975), p. 67.

4. Johann Wolfgang von Goethe, as quoted in Wolf
   Schneider, Babylon is Everywhere, trans. Inge-
   borg Sammet and John Oldenburg (New York: McGraw
   Hill Book Co., Inc., 1960), p. 182.

5. Joseph Harriss, The Tallest Tower (Boston: Houghton
   Mifflin Company, 1975), p. 20.

6. Frank Lloyd Wright, "The Tyranny of the Skyscraper",
    in The Future of Architecture (New York: Horizon
    Press, 1953), p. 154.

7. Montgomery Schuyler, "The Evolution of the Sky-
    scraper," in American Architecture and Other
    Writings, ed. William H. Jordy and Ralph Coe,
    New York: Atheneum, 1964), p. 214.

8. Gaston Bachelard, The Poetics of Space, trans.
    Maria Jolas (Boston: Beacon Press, 1969), p. 24.

255

REFERENCES

BABEL

Eliade, Mircea. Images and Symbols: Studies in Religious Symbolism. New York: Sheed and Ward, 1969.

Lancaster, Clay. Architectural Follies in America. Rutland, Vt.: Charles E. Tuttle Company, 1960.

Mumford, Lewis. The City in History. New York: Harcourt, Brace and World, Inc., 1961.

Parrot, André. The Tower of Babel. Translated by Edwin Hudson. New York: Philosophical Library, 1955.

Schneider, Wolf. Babylon is Everywhere. Translated by Ingeborg Sammet and John Oldenburg. New York: McGraw-Hill Book Co., Inc., 1960.

Taylor, René. "Hermetism and Mystical Architecture in the Society of Jesus." In Baroque Art: The Jesuit Contribution, edited by Rudolf Wittkower and Irma B. Jaffe. New York: Fordham University Press, 1972.

ALEXANDRIA: THE PHAROS

Cavaglieri, Giorgio. "Outline for a History of City Planning from Prehistory to the Fall of the Roman Empire", Society of Architectural Historians Journal 8: 1-2: 43-54.

Hague, Douglas B. and Christie, Rosemary. Lighthouses: Their Architecture, History and Archeology. Llandysul, Wales: Gomer Press, 1975.

Schneider, Wolf. Babylon is Everywhere. Translated by Ingeborg Sammet and John Oldenburg. New York: McGraw-Hill Book Co., Inc., 1960.

Thiersch, Hermann. _Pharos: Antike Islam und Occident._
        Leipzig: Druck und Verlag von B.G. Teubner,
        1909.

ROUND TOWERS

Champneys, Arthur C. _Irish Ecclesiastical Architecture._
        2nd ed. New York: Hacker Art Books, 1970.

Conant, Kenneth John. _Carolingian and Romanesque
        Architecture._ Baltimore: Penguin Books, 1959.

Kubach, Hans Erich. _Romanesque Architecture._ New
        York: Harry N. Abrams, Inc., 1975.

Stokes, Margaret. _Early Christian Art in Ireland._
        Covent Garden: Chapman and Hall, Ltd., 1887.

AIX-LA-CHAPELLE: THE WESTWORK

Conant, Kenneth John. _Carolingian and Romanesque
        Architecture._ Baltimore: Penguin Books, 1959.

Kleinbauer, Eugene W. "Charlemagne's Palace Chapel at
        Aachen and Its Copies." _Gesta_ 4 (Spring 1965:
        2-11)

Krautheimer, Richard, _Early Christian and Byzantine
        Architecture._ Baltimore: Penguin Books, 1965.

Kubach, Hans Erich. _Romanesque Architecture._ New
        York: Harry N. Abrams, Inc., 1975.

Rykwert, Joseph. _Church Building._ New York: Hawthorn
        Books, 1966.

Saalman, Howard. _Medieval Architecture._ New York:
        George Braziller, 1962.

Saalman, Howard. _Medieval Cities._ New York: George
        Braziller, 1968.

Sanderson, Warren. "The Sources and Significance of
        the Ottonian Church of Saint Pantaleon at
        Cologne." _Society of Architectural Historians
        Journal_ 20:2: 83-96.

PISA: THE CAMPANILE

Conant, Kenneth John. Carolingian and Romanesque
        Architecture. Baltimore: Penguin Books, 1959.

Goodyear, W.H. "The Leaning Tower of Pisa." Architec-
        tural Record, January - March 1898, pp. 257-294.

Kubach, Hans Erich. Romanesque Architecture. New York:
        Henry N. Abrams, Inc., 1975.

"The Leaning Tower of Pisa: A Report on the State of
        its Inclination." Architectural Review 28
        (1910): pp. 246-7.

Ross, Janet and Erichsen, Nelly. The Story of Pisa.
        Nendeln: Kraus-Thomson Organization Ltd., 1970.

Ruskin, John. The Seven Lamps of Architecture. New
        York: The Noonday Press, 1961.

Trachtenberg, Marvin. The Campanile of Florence
        Cathedral. New York: New York University Press,
        1971.

Waley, Daniel. The Italian City-Republics. New York:
        McGraw Hill, 1969.

CITY FORTRESSES

Conant, Kenneth John. Carolingian and Romanesque
        Architecture. Baltimore: Penguin Books, 1959.

Cowan, Henry J. The Master Builders: A History of
        Structural and Environmental Design from Ancient
        Egypt to the Nineteenth Century. New York: John
        Wiley and Sons, 1977.

Gardner, Edmund G. The Story of Siena and San Gimig-
        nano. Nendeln: Kraus-Thomson Organization Ltd.,
        1971.

Goodyear, W.H. "The Leaning Tower of Pisa". Architec-
        tural Record, January-March 1898, pp. 257-294.

Hughes, Quentin. Military Architecture. New York:
        St. Martin's Press, 1974.

259

Krautheimer, Richard. _Rome: Profile of a City_, 312-1308. Princeton N.J.: Princeton University Press, 1980.

Rorig, Fritz. _The Medieval Town_. Berkeley: University of California Press, 1971.

Ross, Janet and Erichsen, Nelly. _The Story of Pisa_. Nendeln: Kraus-Thomson Organization Limited, 1970.

Saalman, Howard. _Medieval Cities_. New York: George Braziller, 1968.

Toy, Sidney. _A History of Fortification from 3000 B.C. to A.D. 1700_. 2nd ed. London: Heinemann, 1966.

Trachtenberg, Marvin. _The Campanile of the Florence Cathedral_. New York: New York University Press, 1971.

Waley, Daniel. _The Italian City-Republics_. New York: McGraw-Hill, 1969.

Wiel, Alethea. _The Story of Bologna_. Nendeln: Kraus-Thomson Organization Limited, 1970.

FLORENCE: PALAZZO VECCHIO

Frankl, Paul. _Gothic Architecture_. Baltimore: Penguin Books, 1962.

Mumford, Lewis. _The City in History_. New York: Harcourt, Brace and World, Inc., 1961.

Ruskin, John. _The Seven Lamps of Architecture_. New York: The Noonday Press, 1961.

Saalman, Howard. _Medieval Cities_. New York: George Braziller, 1968.

Trachtenberg, Marvin. _The Campanile of the Florence Cathedral_. New York: New York University Press, 1971.

Waley, Daniel. _The Italian City Republics_. New York: McGraw Hill, 1969.

BRUGES: THE BELFRY

Frankl, Paul. <u>Gothic Architecture</u>. Baltimore: Pen-
        guin Books, 1962.

Mumford, Lewis. <u>The City in History</u>. New York:
        Harcourt, Brace and World, Inc., 1961.

Rorig, Fritz. <u>The Medieval Town</u>. Berkeley: Univer-
        sity of California Press, 1971.

Saalman, Howard. <u>Medieval Cities</u>. New York: George
        Braziller, 1968.

Stratton, Arthur. "The Architecture of Bruges".
        <u>Architectural Review</u> 42 (July-December 1917):
        110-116.

Van de Walle, A.J.L. <u>Gothic Art in Belgium</u>. Trans-
        lated by J.A. Kennedy. Brussels: Marc Vokaer,
        1971.

STRASBOURG: THE SPIRE

Bacon, Edmund N. <u>Design of Cities</u>. New York: The
        Viking Press, 1967.

Boëthius, Axel and Ward-Perkins, J.B. <u>Etruscan and
        Roman Architecture</u>. Baltimore: Penguin Books,
        1970.

Branner, Robert. <u>Gothic Architecture</u>. New York:
        George Braziller, 1961.

Frankl, Paul. <u>The Gothic</u>. Princeton, N.H.: Princeton
        University Press, 1960.

Grodecki, Louis. <u>Gothic Architecture</u>. Translated by
        I. Mark Paris. New York: Harry N. Abrams,
        Inc., 1977.

Hürlimann, Martin and Bony, Jean. <u>French Cathedrals</u>.
        London: Thames and Hudson, 1967.

Jantzen, Hans. <u>High Gothic</u>. Translated by James
        Palmes. New York: Pantheon Books, 1962.

Moore, Charles Herbert. <u>Development and Character of
        Gothic Architecture</u>. New York: Macmillan
        Company, 1906.

Mumford, Lewis. The City in History. New York: Harcourt, Brace and World, Inc., 1961.

Panofsky, Erwin. Early Netherlandish Painting: Its Origins and Character. Cambridge: Harvard University Press, 1953.

Panofsky, Erwin. Gothic Architecture and Scholasticism. New York: Meridian Books, 1957.

Porter, Arthur Kingsley, Medieval Architecture: Its Origins and Development. 2 vols. New York: The Baker and Taylor Company, 1909.

Rodin, Auguste. Cathedrals of France. translated by Elisabeth Geissbuhler. Boston: Beacon Press, 1965.

Rorig, Fritz. The Medieval Town. Berkeley: University of California Press, 1971.

Rykert, Joseph. Church Building. New York: Hawthorn Books, 1966.

Saalman, Howard. Medieval Architecture. New York: George Braziller, 1962.

Smith, Norris Kelly. "Crisis in Jerusalem." In Late Entries to the Chicago Tribune Tower Competition, edited by Stanley Tigerman. New York: Rizzoli, 1980.

Stookey, Laurence Hull. "The Gothic Cathedral as the Heavenly Jerusalem: Liturgical and Theological Sources." Gesta 8 (1964): 35-41.

VILLA D'ESTE

Ackerman, James S. The Cortile del Belvedere. Biblioteca Apostolica Vaticana, 1954.

Ackerman, James S. Palladio. Baltimore: Penguin Books, 1966.

Benevelo, Leonardo. The Architecture of the Renaissance. 2 vols. Boulder, Colo.: Westview Press, 1978.

Moos, Stanislaus von. "The Palace as a Fortress:
        Rome and Bologna under Pope Julius II". In
        Art and Architecture in the Service of Politics,
        edited by Henry A. Millon and Linda Nochlin.
        Cambridge: MIT Press, 1978.

Mumford, Lewis. The City in History. New York:
        Harcourt, Brace and World, Inc., 1961.

Murray, Peter. Architecture of the Italian Renaissance.
        New York: Schocken Books, 1963.

Rykwert, Joseph. Church Building. New York: Hawthorn
        Books, 1966.

Shepherd, J.C. and Jellicoe, G.A. Italian Gardens of
        the Renaissance. London: Alex Tiranti, 1966.

Wharton, Edith. Italian Villas and their Gardens.
        New York: The Century Co., 1904.

Wofflin, Heinrich. Renaissance and Baroque. Trans-
        lated by Kathrin Simon. Ithaca, N.Y.: Cornell
        University Press, 1964.

FONTHILL ABBEY

Britton, John. Graphical and Literary Illustrations
        of Fonthill Abbey. London: Burton Cottage,
        Burton Street, 1823.

Brockman, H.A.N. "Fonthill Abbey". Architectural
        Review 95 (June 1944): 149-56.

Collins, Peter. Changing Ideals in Modern Architec-
        ture. Montreal: McGill University Press, 1965.

Frankl, Paul. The Gothic. Princeton, N.J.: Princeton
        University Press, 1960.

Herrick, George H. "Wyatt's Folly". Journal of the
        American Institute of Architects 19 (March
        1953): 122-24.

Hussey, Christopher. The Picturesque. London: Frank
        Cass and Co., Ltd., 1927.

Lang, S. "The Principles of the Gothic Revival in
        England", Journal of the Society of Architec-
        tural Historians 25:4: 240-267.

Lees-Milne, James. *William Beckford*. Great Britain:
        Compton Russell Ltd., 1976.

Ruskin, John. *The Seven Lamps of Architecture*. New
        York: The Noonday Press, 1961.

PARIS: EIFFEL TOWER

Barthes, Roland. *The Eiffel Tower and Other Mytholo-
        gies*. Translated by Richard Howard. Toronto:
        McGraw-Hill Ryerson Ltd., 1979.

Benevelo, Leonardo. *History of Modern Architecture*.
        Translated by J.H. Landry. 2 vols. 3rd ed.
        Cambridge: MIT Press, 1971.

Billington, David P. *Structures and the Urban Envir-
        onment*. Princeton, N.J.: Department of Civil
        Engineering, Princeton University, 1978.

Collins, Peter. *Changing Ideals in Modern Architec-
        ture*. Montreal: McGill-Queen's University
        Press, 1965.

Giedion Sigfried. *Space, Time and Architecture*.
        Cambridge: Harvard University Press, 1941.

Harriss, Joseph. *The Tallest Tower*. Boston: Houghton
        Mifflin Company, 1975.

Jenkins, Frank I. "Harbingers of Eiffel's Tower,"
        Society of Architectural Historians Journal
        16:4: 22-29.

Richards, J.M. "A Tower for London," *Architectural
        Review* (November 1940): 141-44.

Wachsmann, Konrad. *The Turning Point of Building:
        Structure and Design*. Translated by Thomas E.
        Burton. New York: Reinhold Publishing Corpora-
        tion, 1961.

CHICAGO: THE RELIANCE BUILDING

Bachelard, Gaston. *The Poetics of Space*. Translated
        by Maria Jolas. Boston: Beacon Press, 1969.

Benevelo, Leonardo. History of Modern Architecture.
    Translated by H.J. Landry. 2 vols. 3rd ed.
    Cambridge: MIT Press, 1966.

Billington, David P. Structure in the Urban Environment. Princeton University: Department of
    Civil Engineering, 1978.

Burchard, John and Bush-Brown, Albert. The Architecture of America: A Social and Cultural History.
    Boston: Little, Brown and Company, 1961.

Condit, Carl W. The Chicago School of Architecture.
    Chicago: The University of Chicago Press, 1964.

Conrads, Ulrich. Programs and Manifestoes on 20th-
    century Architecture. Translated by Michael
    Bullock. Cambridge: MIT Press, 1970.

Frampton, Kenneth. Modern Architecture: A Critical
    History. New York: Oxford University Press,
    1980.

Giedion, Sigfried. Space, Time and Architecture.
    Cambridge: Harvard University Press, 1941.

Gottmann, Jean and Harper, Robert A. Metropolis on
    the Move: Geographers Look at Urban Sprawl.
    New York: John Wiley and Sons, Inc., 1967.

Mumford, Lewis. The Brown Decades. New York: Dover
    Publications, Inc., 1931.

Rowe, Colin. "Chicago Frame". In the Mathmatics of
    the Ideal Villa and Other Essays. Cambridge:
    MIT Press, 1976.

Schuyler, Montgomery. American Architecture and Other
    Writings. Edited by William H. Jordy and Ralph
    Coe. New York: Atheneum, 1964.

Sullivan, Louis. "The Tall Office Building Artistically
    Considered." In Kindergarten Chats and Other
    Writings. New York: Wittenborn, Schultz, Inc.,
    1947.

265

Webster, J. Carson. "The Skyscraper: Logical and
    Historical Considerations." Society of Archi-
    tectural Historians Journal 18:4: 126-39.

Weisman, Winston. "New York and the Problem of the
    First Skyscraper." Society of Architectural
    Historians Journal 12:1: 13-21.

Wright, Frank Lloyd. "The Art and Craft of the Machine."
    In Frank Lloyd Wright: Writings and Buildings.
    Edited by Edgar Kaufmann. New York: Meridian
    Books, 1960.

Wright, Frank Lloyd. The Future of Architecture. New
    York: Horizon Press, 1953.

Wright, Frank Lloyd. "Skyscraping". In Frank Lloyd
    Wright on Architecture. Edited by Frederick
    Gutheim. New York: Duell, Sloan and Pearce,
    1941.

Zoll, Stephen. "Superville: New York - Aspects of Very
    High Bulk." The Massachusetts Review, Summer
    1973, pp. 447-516.

NEW YORK: THE EMPIRE STATE
AND WOOLWORTH BUILDINGS

Agrest, Diana. "Architectural Anagrams: The Symbolic
    Performance of Skyscrapers." Oppositions 11
    (Winter 1977): 26-51.

Aregger, Hans and Glaus, Otto. Highrise Building and
    Urban Design. New York: Frederick A. Praeger,
    1967.

Benevelo, Leonardo. History of Modern Architecture.
    Translated by J.H. Landry. 2 vols. 3rd ed.
    Cambridge: M.I.T. Press, 1971.

Bossom, Alfred. Building to the Skies: The Romance
    of the Skyscraper. New York: The Studio
    Publications, Inc. 1934.

Burchard, John and Bush-Brown, Albert. The Architec-
    ture of America: A Social and Cultural History.
    Boston: Little, Brown and Company, 1961.

Cheny, Sheldon. The New World Architecture. New York:
    AMS Press, 1930.

Cherry, Mike. On High Steel: The Education of an
        Ironworker. New York: Quadrangle/The New York
        Times Book Co., 1974.

Clark, W.C. and Kingston, J.L. The Skyscraper: A Study
        in the Economic Height of Modern Office
        Buildings. New York: American Institute of
        Steel Construction, Inc., 1930.

Ferriss, Hugh. The Metropolis of Tommorrow. New York:
        Ives Washburn, 1929.

Gottman, Jean and Harper, Robert A. Metropolis on the
        Move: Geographers Look at Urban Sprawl. New
        York: John Wiley and Sons, Inc., 1967.

Hayden, Dolores. "Skyscraper Seduction, Skyscraper
        Rape." Heresis, May 1977, pp. 108-115.

Jeanneret-Gris, Charles Edouard. When the Cathedrals
        Were White. New York: Reynal and Hitchcock,
        1947.

Koolhaas, Rem. Delirious New York. New York: Oxford
        University Press, 1978.

"A Pacific Coast Skyscraper." Architectural Record,
        May 1911, pp. 407-410.

Robinson, Cervin and Bletter, Rosemarie Haag. Sky-
        scraper Style. New York: Oxford University
        Press, 1975.

Schneider, Wolf. Babylon is Everywhere. Translated
        by Ingeborg Sammet and John Oldenburg. New
        York: McGraw-Hill Book Company, Inc., 1960.

Schuyler, Montgomery. "The Towers of Manhattan."
        Architectural Record, February 1913, pp. 98-122.

Scully, Vincent. American Architecture and Urbanism.
        New York: Praeger Publishers, 1969.

Tafuri, Manfredo. "The Disenchanted Mountain: The
        Skyscraper and the City." In the American City,
        edited by Giorgio Ciucci, Francesco Dal Co,
        Mario Manieri-Elia, Manfredo Tafuri. Cambridge:
        M.I.T. Press, 1979.

267

"Was the Home Insurance Building in Chicago the First
        Skyscraper of Skeleton Construction?" Architec-
        tural Record, August 1934, pp. 26-32.

Webster, J. Carson. "The Skyscraper: Logical and
        Historical Considerations." Society of Architec-
        tural Historians Journal 18:4: 126-39.

Weisman, Winston. "New York and the Problem of the
        First Skyscraper." Society of Architectural
        Historicans Journal 12:1: 13-21.

Zoll, Stephen. "Superville: New York - Aspects of Very
        High Bulk." The Massachusetts Review, Summer
        1973, pp. 447-516.

FRANK LLOYD WRIGHT: MILE HIGH SKYSCRAPER

Benevelo, Leonardo, History of Modern Architecture.
        Translated by J.H. Landry, 2 vols, 3rd ed.
        Cambridge: M.I.T. Press, 1971.

Billington, David P. Structures and the Urban Environ-
        ment. Princeton, N.J.: Department of Civil
        Engineering, Princeton University, 1978.

Ciucci, Giorgio. "The City in Agrarian Ideology and
        Frank Lloyd Wright: Origins and Development of
        Braodacres." In The American City, edited by
        Giorgio Ciucci, Francesco Dal Co, Manieri-Elia,
        Manfredo Tafuri. Cambridge: M.I.T. Press, 1979.

Frampton, Kenneth. Modern Architecture: A Critical
        History. New York: Oxford University Press,
        1980.

"The Illonois". Architectural Record. November 1956,
        p. 11.

Rowe, Colin. "Chicago Frame". In The Mathmatics of
        the Ideal Villa and Other Essays. Cambridge:
        M.I.T. Press, 1976.

Tafuri, Manfredo. "The Disenchanted Mountain: The
        Skyscraper and the City." In The American City,
        edited by Giorgio Ciucci, Francesco Dal Co,
        Mario Manieri-Elia, Manfredo Tafuri. Cambridge:
        M.I.T. Press, 1979.

"The Tall One". Forum. July-August 1970, pp. 36-45.

Wright, Frank Lloyd. _An American Architecture_. Edited
     by Edgar Kaufmann. New York: Bramhall House,
     1955.

Wright, Frank Lloyd. "American Architecture Today".
     In _Frank Lloyd Wright on Architecture_, edited
     by Frederick Gutheim. New York: Duell, Sloan
     and Pearce, 1941.

Wright, Frank Lloyd, "The Art and Craft of the Machine".
     In _Frank Lloyd Wright: Writings and Buildings_,
     edited by Edgar Kaufmann and Ben Raeburn. New
     York: Meridian Books, 1960.

Wright, Frank Lloyd. _An Autobiography_. London:
     Longmans, Green and Company, 1933.

Wright, Frank Lloyd. "Chicago Culture". _In Frank
     Lloyd Wright on Architecture_.

Wright, Frank Lloyd. "Experimenting With Human Lives".
     In _Frank Lloyd Wright on Architecture_.

Wright, Frank Lloyd. _The Living City_. New York:
     Meridian, 1970.

Wright, Frank Lloyd. "Skyscraping". _In Frank Lloyd
     Wright on Architecture_.

Wright, Frank Lloyd. _The Story of the Tower: The Tree
     That Escaped the Crowded Forest_. New York:
     Horizon Press, 1956.

Wright, Frank Lloyd. "The Tyranny of the Skyscraper",
     in _The Future of Architecture_. New York:
     Horizon Press, 1953.

ILLUSTRATIONS

Illustrations were reprinted from the following sources:

1. F. Grossman, <u>Pieter Bruegel: The Paintings</u> (London: Phaidon Press, 1966).

2. Rudolf Wittkower, <u>Baroque Art: The Jesuit Contribution</u> (New York: Fordham University Press, 1972).

3. Jacques Boudet, Claude Manceron and Jacques Ostier, <u>The Great Works of Mankind</u> (New York: Golden Press, 1962).

4. Wittkower, <u>Baroque Art</u>.

5. Hermann Thiersch, <u>Pharos: Antike Islam und Occident</u> (Leipzig: Druck und Verlag von B.G. Tuebner, 1909).

6. Thiersch, <u>Pharos</u>.

7. Harry Thurston Peck, <u>Harper's Dictionary of Classical Literature and Antiquities</u> (New York: Cooper Square Publishers, Inc., 1965).

8. Thiersch, <u>Pharos</u>.

9. George Mott, <u>The Churches and Abbeys of Ireland</u> (New York: W.W. Norton and Co., 1976).

10. Richard Krautheimer, <u>Early Christian and Byzantine Architecture</u> (Baltimore: Penguin Books, 1965).

11. Martin Trachtenberg, <u>The Campanile of Florence Cathedral</u> (New York: New York Unviersity Press, 1971).

12. Hans Erich Kubach, <u>Romanesque Architecture</u> (New York: Harry N. Abrmas, Inc., 1975).

13. Kubach, Romanesque Architecture.

14. Henry A. Millon and Alfred Frazier, Key Monuments of the History of Architecture (New York: Henry N. Abrams, Inc., 1965).

15. Howard Saalman, Medieval Architecture (New York: George Braziller, 1962.

16. Saalman, Medieval Architecture.

17. Trachtenberg, Campanile.

18. John McAndrew, Venetian Architecture of the Early Renaissance (Cambridge, MIT Press, 1980).

19. Daniel Waley, The Italian City - Republics (New York: McGraw Hill, 1969).

20. Norman F. Carver, Italian Hilltowns (Kalamazzo, Mich.: Documan Press, Ltd., 1979).

21. Kubach, Romanesque Architecture.

22. Sigfried Giedion, Space, Time and Architecture (Cambridge: Harvard University Press, 1976).

23. Carver, Italian Hilltowns.

24. Trachtenberg, Campanile.

25. Trachtenberg, Campanile.

26. Arthur Stratton, "The Architecture of Bruges", Architectural Review 42.

27. Stratton, Architectural Review 42.

28. Hans Reinhardt, La Cathedrale de Strasbourg (France: Arthaud, 1972).

29. Howard Saalman, Medieval Cities (New York: George Braziller, 1968).

30. Erwin Panofsky, Early Netherlandish Painting: Its Origins and Character (Cambridge: Harvard University Press, 1953).

31. Panofsky, Early Netherlandish Painting.

32. Millon and Frazier, Key Monuments of the History of Architecture.

272

33. Millon and Frazier, <u>Key Monuments of the History of Architecture</u>.

34. J.C. Shepherd and G.A. Jellicoe, <u>Italian Gardens of the Renaissance</u> (London: Alex Tiranti, 1966).

35. James S. Ackerman, <u>The Cortile del Belvedere</u> (Biblioteca Apostolica Vaticana, 1954).

36. Henry A. Millon and Linda Nochlin, <u>Art and Architecture in the Service of Politics</u> (Cambridge: MIT Press, 1978).

37. James Lees-Milne, <u>William Beckford</u> (Great Britian: Compton Russell Ltd., 1976).

38. H.A.N. Brockman, "Fonthill Abbey", <u>Architectural Review</u> 95.

39. Brockman, <u>Architectural Review</u> 95.

40. Brockman, <u>Architectural Review</u> 95.

41. Lees-Milne, <u>William Beckford</u>.

42. Joseph Harriss, <u>The Tallest Tower</u> (Boston: Houghton Mifflin Company, 1975).

43. Frank I. Jenkins, "Harbingers of Eiffel's Tower", <u>Society of Architectural Historians Journal</u> 16:4.

44. Jenkins, <u>Society of Architectural Historians Journal</u> 16:4.

45. Jenkins, <u>Society of Architectural Historians Journal</u> 16:4.

46. Leonardo Benevelo, <u>History of Modern Architecture</u> (Cambridge: MIT Press, 1971).

47. Sigfried Giedion, <u>Space, Time and Architecture</u> (Cambridge: Harvard University Press, 1941).

48. Giedion, <u>Space, Time and Architecture</u>.

49. J.M. Richards, "A Tower for London", <u>Architectural Review</u> (November 1940).

50. Richards, <u>Architectural Review</u> (November 1940).

273

51. William H. Jordy and Ralph Coe, ed., _American Architecture and Other Writings_ (New York: Atheneum, 1964).

52. _Empire State: A Pictorial Record of its Construction_ (New York: William Edwin Rudge, 1931).

53. Alfred Bossom, _Building to the Skies: The Romance of the Skyscraper_ (New York: The Studio Publications, 1934).

54. Jean Ferriss Leich, _Architectural Visions: The Drawings of Hugh Ferriss_ (New York: Watson-Guptill Publications, 1980).

55. Cervin Robinson and Rosemarie Haag Bletter, _Skyscraper Style_ (New York: Oxford University Press, 1975).

56. "The Illinois", _Architectural Record_, November 1976.

57. Vincent Scully, _American Architecture and Urbanism_ (New York: Praeger Publishers, 1969).

58. "The Tall One", _Forum_, July-August 1970.

59. Jean-Michel Folon.