ARCHITECTURAL REPERCUSSIONS OF ENVIRONMENTAL CLIMATE CONTROL IN THE GENERATION OF ADMINISTRATIVE BUILDING TYPES; DIFFERENCES BETWEEN MODEL AND TECHNOLOGY CHOSEN.

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1. INTRODUCTION

2. GENERATION OF MODELS

3. INFLUENCES EN EUROPE

4. REINTERPRETATION OR GENERATION

5. CONCLUSIONS

### The end of the 19th century

**The Chicago School**
- 1905
  - F. Lloyd Wright
  - *Larkin Administration*

**The International Style**
- 1932
  - Howe and Lescaze
  - *PSFS*

**Modern Movement**
- 1952
  - SOM
  - *Lever House*

- 60s

- 80s

**Britain**
- Spain

### Architectural type
- Office buildings

### Thermal installations

- **• Generation of models.**
- **• Influences in Europe.**
- **• Reinterpretation or generation of new models.**
- **• Conclusions.**
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Heavy block with open court

• New uses
• Advances in construction technology

Block with inner atrium

The polyhedral crystal tower

The articulated tower
2.1 HEAVY BLOCK WITH OPEN COURT

Chicago at the end of the 19th century.

The Office: an activity that is fixed in time and space.

Development of lifts and the steel structures.

“Chicago Quarter Block”. 15-floor maximum.

VENTILATED AND LIT NATURALLY

DEPTH OF THE OFFICE SPACE

MAXIMUM SURFACE OF THE SKIN AROUND THE MOST USEFUL VOLUME OF WORK SPACE

Floor in “U”, “E”, etc.
2.1 HEAVY BLOCK WITH OPEN COURT

One of the first administrative buildings.
Setback in the form of a patio.
NATURAL LIGHTING AND VENTILATION.

Guaranty building.

Milam building. 1928
San Antonio, Texas
Architect: George Willis
Engineer: M.L.Driver

INSTALLATION OF ARTIFICIAL CLIMATE CONTROL.
2.2 BLOCK WITH INNER ATRIUM


Compact block.

Work Area: Central well and balconies.

[Image of block with inner atrium]

SEALED AND ARTIFICIALLY AIR-CONDITIONING
REDUCTION IN THE NUMBER OF WINDOWS
LIT BY SKYLIGHTS


http://www.cardcow.com

_The Larkin Administration._

“... the climate control handling system has a crucial interface with the inner and outer shape”. R. Banham.
## 2.2 BLOCK WITH INNER ATRIUM

*The Larkin.*

**ARTICULATED BLOCK:** the towers for the emplacing of the stairs and the gaps for the ventilation ducts and the rest of the installations have a bearing on the volumetric configuration of the block.

Inner spaces are highlighted.

The ventilation grilles are found below the sills.
2.3 THE ARTICULATED TOWER

The International Style:

“The era of the open-plan office had yet to arrive”. D. Arnold

EXTERNALLY TWO DIFFERING VOLUMES:
A glass office tower and a rather more opaque core containing the services, mechanical systems and stairs.

Prior to WORLD WAR II: “ALL AIR” AIR CONDITIONING:
Need for space required by having to emplace the vertical ducts.
2.3 THE ARTICULATED TOWER

**Philadelphia Savings Fund Society**

- **AIR CONDITIONING “ALL AIR”**. Double duct.
- **SERVER SPACE IN THE SOUTH SECTION**
- **INTERMEDIATE MECHANICAL FLOOR**
- **THE FRAMED ELEMENT IN THE UPPER PART**

1932. Philadelpia. (N.Y.)
32-story. T-shaped floor
Arquitectes: G. Howe and W. Lescaze

Architects: Skidmore, Owings and Merrill.
### 2.4 THE POLYHEDRAL CRYSTAL TOWER

Paradigm of economic development.

Chicago and New York in the 50s and 60s.

Curtain wall.

Central services and communications core.

Free space for the offices

<table>
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<tr>
<th>COMPLETE IMPLEMENTATION OF AIR CONDITIONING SYSTEMS.</th>
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<td>SYSTEMS USING WATER + AIR: reduction in vertical ducts.</td>
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2.4 THE POLYHEDRAL CRYSTAL TOWER

Lever House

21-stories.

PLINTH AND MECHANICAL FLOOR AT THE TOP.

AIR CONDITIONING SYSTEMS: “air and water”.

Seagram, 1958. N.Y.

2.4 THE POLYHEDRAL CRYSTAL TOWER

“CARRIER WEATHERMASTER”:
- Induction unit.
- Energy is transported by water.
- Fewer vertical ducts.

United Nations.
“Le Corbusier accomplished his dream of creating a large glass building in an urban location and here in New York he also found the talent of the one man who could make it work: Willis Carrier”. R. Banham.
2.1 HEAVY BLOCK WITH OPEN COURT


FLOOR IN “E”. NATURAL VENTILATION.


**Britain.** Barbican. London. 1960s.

HEAVY BLOCK. NATURAL VENTILATION.

Original drawing by architects. www.zaragoza.es
2.2 BLOCK WITH INNER ATRIUM


**ARTICULATION CORES.** INNER ATRIUM. HIGHLIGHTED.
### 2.3 THE ARTICULATED TOWER


**Spain. CRYSTAL ARTICULATED TOWERS.** Ibercaja (Zaragoza) and Philips (Madrid) Buildings.

Source: "El edificio de oficinas". Luis Fernández-Galiano
2.4 THE POLYHEDRAL CRYSTAL TOWER


SKIN AND CENTRAL CORE.
1. Trade Buildings.
   Barcelona.
2. Fundación Juan March.
   Madrid.
   Berna.

Source floors: "El edificio de oficinas". Luis Fernández-Galiano
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OIL CRISIS (1970 onwards)

REINTERPRETATION OR CREATION OF NEW TYPES??

Curtain wall

Ducts and pipes

Air-conditioning

GLASS WITH MULTIPLE LAYERS

ACTIVE FAÇADE

RENEWABLE ENERGIES + NATURAL VENTILATION

http://www.amisingplanet.com
One of the driving forces behind the establishment of the formal traits of the various architectural types for the building designed for administrative use that emerged in the America of the late 19th century to its culmination in the glazed office tower of the 1950s is the adequate heating of the work space.

In the first half of this period, the shape, cladding and volumetric configuration of the office blocks were defined starting from achieving optimal natural ventilation and light conditions in most of the offices considered for construction.

The majority of the climate controlled buildings dating from before World War II had “All Air” air conditioning systems. The result was administrative buildings whose height and shape was conditioned by the spatial and energy needs of the vertical climate control ducts.
Only the implementation of the “air and water” systems allowed complete dominion over the interior environment of the office buildings. The development of fully sealed, transparent cladding made possible glazed office towers which were open-plan and adaptable to the needs of the users.

The models created in cities like Chicago and New York were repeated in Europe in the succeeding years, thus confirming that the choice of type when designing an office building conditions the type of thermal installations needed therein.
Thank you

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