### Natural Pollutants include

Carbon Dioxide and Natural Aerosols

### Artificial Pollutants include

Sulpher Dioxide, Nitrogen Oxides and Artificial Aerosols

It is well known that air pollutants are usually classified either into suspended particulate matters (*Dust, fumes, Mists* and *Smokes*), gaseous (*Gases* and *Vapors*) or odors, where, clean air comprises O (21%), N (78 %), a number of rare gases as Argon and CO2 at a low percentage concentration (0.03 %) WHO, (2000).

Also, we can confirm that clean air contains approximately 0.03ppm of SO2 0.053ppm of NO2 and 0.08ppm of O3 varied with meteorological condition, in addition to chlorine compounds and other kinds of pollutants which produced by industrial activities and vehicular traffic.

## **Biological effects**

This factors represent one of the major of deterioration factors affecting stone and monumental buildings especially in moisten areas and they divided to 4 essential categories as fallow:

**Botanical effects** 

Birds effects

Insects effects
Micro-organisms effects

All of these factor have a complex deterioration mechanisms either physically or chemically.

## **Human activity**

There are many deterioration mechanisms resulting from different *Human activity* which we can classify it as fallow:

**Intended Damage** as destruction, firing, theftting, etc...

**Un-Intended Damage** as Wars

Improper conservation works as unsuitable materials and methods...

### Natural Catastrophes

The most destructive factors of deterioration affected either wall paintings or all the archaeological building and its different components by mechanical movements It can be happened by effect of:

Fluids

**Earthquakes** 

**Firs** 

Volcanoes

### Indogenous factors

Means poor quality of materials or/and building techniques that lead to helping the Exogenous factor to destroy all components of monumental building, from this point of view, we can classify it to:

Defects on materials composition

Error in employed techniques



### Heat and Moisture

Surface drying and Thermal expansion of stone components

**Exfoliating of some kinds of stone layers** 

**Fading of colors** 

Surface oxidation

Crystallization of some species of salts in several shapes such as effloresces, Subeffloresces and Crypto- effloresces as a direct result of Sun dried

Diluting of different cement materials dominated in stone compositions

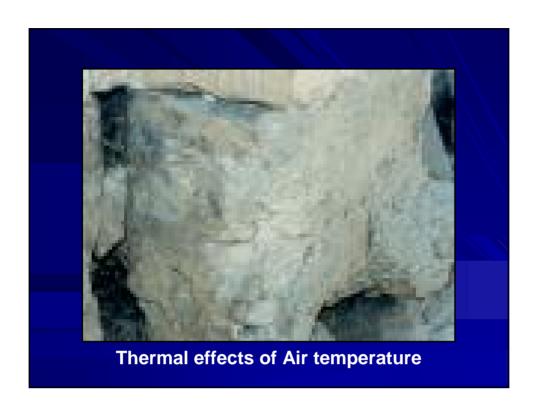
Diluting of different sources of salts either in soil, Stones, Mortars, Plasters or inside the pore structures

Rising damp resulted from the effect of RH

Gilding and Dampness of stone surfaces

Frost and freezing actions

Microbiological growth





























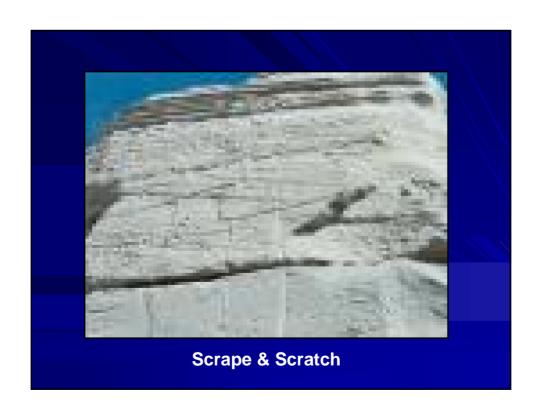


# Wind Erosion Surface drying Granular Desegregation Rotate deterioration Scrape & Scratch Presences of some biological features











# Air pollution

Dusting and contaminated stone surfaces and covering it particles with different kind of pollutants

Presences some layers of salt crusts as Ca Co<sub>3</sub> and Ca So<sub>4</sub> .2H<sub>2</sub>O

Creating some of stress and strain especially inside the pore structures

Chemical dissolution of painting components as a direct results of acid rain

