

# Study of the color composition of Cairo sky under the influence of pollution

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## Abstract

Cairo streets lacks the pure clean color due to the air pollution in a way that there is a colored layer of grey color on the sky and on the buildings, as I knew that Cairo sky is polluted and inclined to grey color however I saw the color of sky in other countries through television, and I was more astonished when I saw the same view on one of the important and greatest city in the United states which is supposed to be more polluted due to the industrial evolution and the development of life style, therefore I got in mind that Cairo sky is clearly polluted and I decided to know about the rate of change and magnitude of pollution through the study of color. When I was in visit of the museum of modern art in Cairo, I found out through the paintings of Egyptian artists within the fifties and sixties of last century clear colors in the painted sky and which would net came to my mind if I think about painting Cairo sky actually. What are the differences in color under the impact of pollution and what is the original blue color in Cairo sky.

## Key words:

Cairo sky, air pollution, color composition

## Introduction

**In Arabic language** as shown in an Arabic dictionary “Elmoheit”, pollution means the smear, as we may say that a person has polluted his clothes with mud is to mean that he smeared it.

We may note that the meaning of pollution is about the change of nature state of things with the mix of other natures or foreign elements, that change its nature, Harm it and impede it form performing its function.

The organizations of economic development and cooperation in Europe had stated a famous definition which is strongly accepted from the specialists and which is the addition by the human being directly or indirectly of any materials or energy to the environment which cause harmful effects which endanger the human health or affects the vital sources or environment systems in a way to inflict the uses of the environment.

The majority of agreements and treaties had approved this definition with minor amendments.

**Pollution is divided into two main types according to its source: natural pollution and industrial pollution.**

- **The natural pollution:** which has its source from natural phenomena which occur from time to time like volcanoes, lightening, storms intervention from the human being.
- **The industrial pollution:** it results from the deed of human being and his activity and has its source in the industrial service and entertainment activities, however the important sources of industrial pollution are the commercial and industrial wastes and the exhaust of cars and chimneys of factories.

**The industrial pollution are divided in three kinds; Solid wastes:** that result from many industries like the dust from the manufacture of cement, and **liquid pollutants** like chemical

solutions from the factories in water sewage, and **gaseous pollutants** like the harmful gazes from the chimneys of factories and strainers of petrol.

**Chief forms of pollution:**

The air pollution, the water pollution, the noise pollution, the light pollution, the visual pollution, the thermal pollution.

**The air pollution is the important for this research as it is directly relevant to the subject of research.**

**The air pollution:**

The definition of air pollution it is the existence of solid or liquid or gaz wastes in quantities that lead to vital economic and physiological damages to human being, animals, plants and machines, or which inflict the nature of things, as the loss of the world reaches annually 5000 millions dollars due to the air pollution on agricultural crops.

Air pollution is the worst pollutants of climate.

Within the course of history and ages, air was not free from pollution due to foreign materials like gases and fumes from the nozzles of Volcanoes, or the burn of forests dust and infinite living creatures that cause diseases.

However human being could of avoid or support it, but the problem appears with manufacture and the spread of industrial revolution all over the world a long with the huge population density, and the rise of number of transportation means which depend engines of distilled petrol as fuel, as cars may be the major cause of air pollution in spite it is a necessity of modern life monoxide and carbon dioxide and Ozone.

**The ways of pollution of air:**

**First:** by suspended solid waste like smoke, car exhaust, dust, cotton dust, cement dust and insecticide dust.

**Second:** by gaseous materials or poisonous steam and Suffocate fumes like Chlore, Carbon

Monoxide, Nitrogen Oxide, Carbon Dioxide, Ozone.

**Third:** the bacteria's, germs, and rot due to the decomposition of plants, dead animals and human wastes.

**Forth:** the atomic natural and industrial radiations.

**Fifth:** the electronic pollution.

**Scenes from Cairo that clarify the extent of air pollution:**



**Figure (1)** A scene from El Azhar garden



**Figure (2)** A scene of Citadel of Salah Eldin from El Azhar garden

Scene of Cairo city that shoes the extent of pollution effect a scene of a part of citadel in Cairo.

**Definite parts of the sky from the above pictures:**















I had chosen these pictures of the sky in order to focus in the two degrees and their comparison with the results of colored experiments.



Figure (3)

Figure (4)

Schedule that shows the experiment of the researcher in order to reach the suitable color composition that simulates the sky color of the sample of research at Cairo city.

The suggestions of sky colors	Deep ultramarine 	 Blue Ultramarine cobalt	 Cerele blue	 Prussian blue
Added colors due to pollution				
 Burnt umber	Deep Ultramarine  burnt umber	Cobalt Ultramarine  burnt umber	Cerele  burnt umber	Prussian  burnt umber
 Grey	Deep Ultramarine  burnt umber grey	Cobalt Ultramarine  burnt umber grey	Cerele  burnt umber grey	Prussian  burnt umber grey

**Through the practical experiment of colors in the above schedule we had found out:**

- **The first row of color up of the schedule:** these shapes represent the main colors of blue upon which the experiment is based.
- **The first column on the left of the schedule:** represents the colors added to the blue, as these colors represent the colors of pollution.
- **The colors in the remaining squares:** they are the colors that result from the mixture of main colors in the upper row and the left column.
- The following survey was given to 10 viewers to compare the results with the original color of the sky:

**Objectives:**

- To identify the composition of colors in Cairo sky under the impact of pollution.

- To identify the degree of original blue color in Cairo sky.
- Present an instructive study to the artists of plastic works based upon the Egyptian environment.

**Methodology :**

An experimental study was carried out to investigate the expression of different levels of colors using of water colors for different scenes of Cairo city which had been chosen for their existence in specific parts of Cairo.

**Procedures:**

- A survey was carried out to collect samples of colors out of different of scenes of Cairo city to identify the form and nature of colors under the effect of air pollution.
- An enquiry was carried out to designate the polluted parts of the sky.

- A group of main blue colors and hues of water colors from the mark Van Gogh in order to identify which is the main blue color of Cairo sky was selected by a group of expertise, painters and art students.
- A number of experimentations were carried out to decide precisely water colors which represent the hues, compositions, and number of colored layers.
- A group of 10 individuals selected normally had the task of deciding the nearest degree of the color of the sky.

#### **Experimental work results:**

#### **Comparing the results of the color experiments and the survey done on 10 specialists, the following was found:**

6 chose square no"1"

3 chose square no"3"

1 chose square no "5"

#### **After the comparison of the results of color experiment, and the roll of specialists, we had found out that:**

**The nearest color to the sky** is ultramarine, as the result of the mixture of three colors ultramarine, burnt umber and grey, this experiment shows the nearness of this experiment to the natural color of the sky.

The color results from ultramarine deep blue, burnt umber and Paynes grey.

The blue color is a medium dense color and the first layer of colors.

**The burnt umber:** which may represents the nature of Egyptian environment full of dust due to geographic nature and could be a part of the carbonic fume pollution of air, as this color is more transparent and less dense.

**The grey color:** it is the color of polluted elements of air from car exhaust, factories, it is the more dense color in the last layer for it is evident and dominant in the colored degree.

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#### **Results:**

Needless to say that it is necessity to face pollution and to get rid of it in our environment for it obliterate a large part of the beauty of natural environment which affects negatively the technical product of the society. A great deal of investigations is urgently needed to cover is area of neglected environmental studies.

The architects, artists and researchers in the field of environment sciences to depend upon this kind of researches in order to identify the change of different environments.

It should be concluded that the experimental part of the study has pointed out the following:

1. The Paynes grey is a main component of the colors of Cairo city as it is the color of industrial and air pollution in the most horrible form.
2. The main blue color in Cairo sky is ultramarine deep.
3. We may say that the mixture of burnt umber and ultramarine blue is the natural color of Cairo sky due to the dusty nature of Egypt and from the geographic nature.
4. The components of sky colors in Cairo under the impact of pollution is the deep ultramarine blue, the Paynes grey and burnt umber.

However, It should be clear that all the experimental work was subject to limitations related to equipment used, the selected subjects and the timing of the experiment. All These elements should be subject to a further invstigation.

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**Survey form which color composition that simulates the sky color Cairo city**

The following schedule shows a group of different colors, choose which looks like the color of the sky that you see actually in Cairo city, while the lower part of the schedule shows a pattern of sky color.

**Appendixes**

The suggestions of sky colors				
Added colors due to pollution	Deep ultramarine	Blue Ultramarine cobalt	Cerulean blue	Prussian blue
	Deep Ultramarine  burnt umber grey	Cobalt Ultramarine  burnt umber grey	Cerulean  burnt umber grey	Prussian  burnt umber grey
The choices	<b>1</b>	<b>2</b>	<b>3</b>	<b>5</b>