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[Science Editor, The Evening Sun]

# Experts Say 2 Pollutants Form 'Invisible Poisonous Bullets'

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The main known health hazards in the air we breathe in the Baltimore metropolitan area are what scientists and engineers call sulfur oxides and particulates.

Each of those two pollutants is thought to be individually detrimental to human health, according to medical experts of the United States Public Health Service and the Maryland Department of Health.

When combined, the two pollutants can produce crippling or even deadly effects, the same experts say.

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## Can Destroy Lungs

The two pollutants seem to combine—in some still little understood way—to form thousands and thousands of tiny, invisible poisonous darts, or disease causing bullets, that can damage or destroy the lungs and other parts of the respiratory systems of men, women and children.

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Infants under 1 and elderly persons over 65 seem to be particularly vulnerable to the lethal, or killing, effects of the two best identified air pollutants here.

The reason, Public Health Service experts in the field of medical research theorize, seems to be:

1)—Your heart and lung system has to work harder and harder as the air we breathe becomes more and more polluted.

2)—The increasing workload thus imposes a strain that could damage, cripple or even cause the complete collapse of the underdeveloped heart and lung systems of babies and the tired and weakened heart and lung systems of the aged.

## Sulfur Oxides

To help understand why the medical experts believe the theory is correct it is necessary to know what sulfur oxides and particulates are.

Sulfur oxides are gases and vapors produced by the combustion, or burning, of coal, oil and other fuels with a high sulfur content.

The sulfur oxides are emitted as the gases from those fuels which are vented to atmosphere.

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Particulates are tiny unburned, grimy sootlike particles on unburned fuel.

## Extremely Small

Public Health Service experts say particulates generally range in size from less than one micron—one twenty-five thousandths of an inch—to the size of a small raindrop.

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Curiously, Public Health Service experts explain, the particulates that the average person finds most annoying are

the ones that currently seem to offer the least health hazards.

These particulates are the grimy, soot-like dirt in the air that you can see. They are the particulates that soil your clothes, plants, automobiles, window sills and anything else left outdoors.

The particulates that seem to be most damaging to the lungs, bronchial tubes and other parts of your respiratory system seem to be the smaller invisible particulates, especially those ranging downward in size from 10 microns, or one-twenty-five hundredths of an inch.

## HEW Report

An extract from a report by the United States Department of Health, Education and Welfare helps to explain that apparent paradox. The excerpt states:

"A cursory examination of knowledge of respiratory function shows that when measuring particulate levels in the environment particle size, rather than quantity of particulate matter, is the governing factor.

"Due to the filtration mechanism of the respiratory tract particles of greater than 10 microns—one-twenty-five hundredths of an inch—in diameter do not reach the lung."

## Senate Panel Report

At any rate, one of the theories of how sulfur oxides and particulates combine to exert a synergistic, or multiplying, effect, on the human body is contained in a staff report of the Senate Subcommittee on Air and Water Pollution.

The chairman of the subcommittee is Senator Edmund S. Muskie, of Maine. Maryland's Senator Joseph Tydings is also a member.

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That report notes:

"A hypothesis proposed to account for the irritant effects of even low concentrations of air pollutants postulates a synergistic effect between the irritants themselves and relatively inert suspended solids.

## More Concentrated

"This hypothesis not only suggests that absorbed irritants represent a more concentrated and more irritant material than the unabsorbed gas.

"It also suggests that the particles act as carriers or vectors, delivering the irritant absorbed on its surface deep into the respiratory tract, perhaps as far as the lower respiratory tract, whereas the unabsorbed gas might never get beyond the upper respiratory tract.

"Thus the irritant might be delivered in larger quantities to a more susceptible and more critical tissue than if it were inhaled in the gaseous form.

"On this theory sulfur dioxide gas, for instance, becomes adsorbed on to the surface of solid particles as a layer more concentrated and more irritant to mucous membranes than the gas itself.

## Practical Significance

"The practical significance of this lies in the fact that, while it is technically difficult to control the emission of sulfur dioxide, it is relatively easy to control the emission of solid particles so that reducing the amount of solids in the atmosphere might also reduce the ill effects of sulfur acids.

"At this time there is insufficient data to support this hypothesis and further epidemiological studies are required."

The problem of lack of data is also why no one really knows how bad or how good is the air we breathe in the Baltimore metropolitan area, according to Jean J. Schueneman.

Mr. Schueneman is the recently appointed director of the division of air quality control of the Maryland Department of Health.

## Not Enough Stations

One reason, he explained is the air quality monitoring network in the Baltimore metropolitan air quality control region consists of but ten monitoring stations. That is seven more stations than existed at the start of this year, but four less than the minimum number of needed stations.

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Four of the monitoring stations are in Baltimore city, and three each are in Baltimore and Anne Arundel counties. There are no network monitoring stations in Howard and Harford counties, the other two counties in the Baltimore metropolitan air quality control region.

Until the network is in full operation and in operation long enough there just will not be enough data available to feed into computers and prepare isopleths, or contour-map like graphs of the amount of air pollution and the way it varies with the meteorological conditions throughout the area.

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## Monitor 24 Hours

Currently, Mr. Schueneman explains, the stations monitor on a 24-hour continuous basis the amount of sulfur oxides, carbon monoxide, and hydrocarbons in the air.

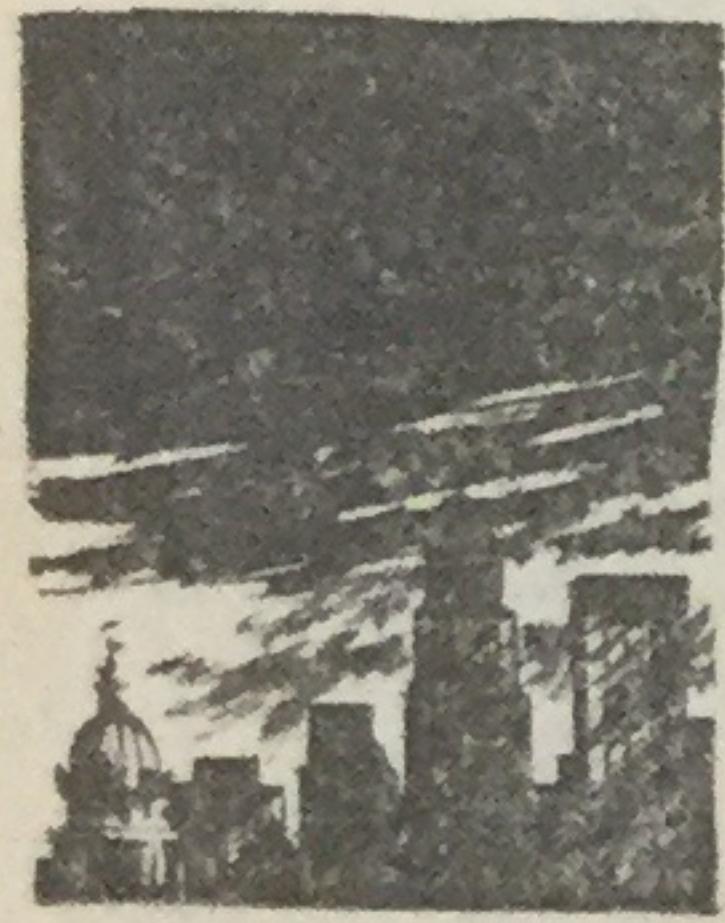
In addition the stations record wind speed and direction, temperature and what is called the "soiling index," or amount of visible dirt that settles out of the air we breathe.

Because of the lack of firm data, Mr. Schueneman is very reluctant to even venture a guess as to how badly polluted the air we breathe here is.

He does note that the Department of Health, Education and Welfare ranks the Baltimore metropolitan air quality control region as being the 16th dirtiest in the nation.

## Concentrations High

When pressed, Mr. Schueneman also said on the basis of "very, very, crude, preliminary spot tabulations" he has made to date it might be said that:



"In suburban parts of the Baltimore metropolitan region concentrations of suspended particulate matter in the area are higher than desirable, while in the central parts levels are one and one half to two and one half times greater than desirable. NOV 12 1968

"Dustfall rates are more than twice as high as desirable at some locations while at others, generally in the suburbs, rates range from satisfactory to only slightly excessive."

Mr. Schueneman declined to spell out just what he considered a desirable level of dustfall. He did note however that a Federal appraisal of air resources here some years ago suggested that "dustfall shall not exceed 20 tons per square mile per month at any location on a yearly average basis." EVE. SUN

#### Other Pollutants

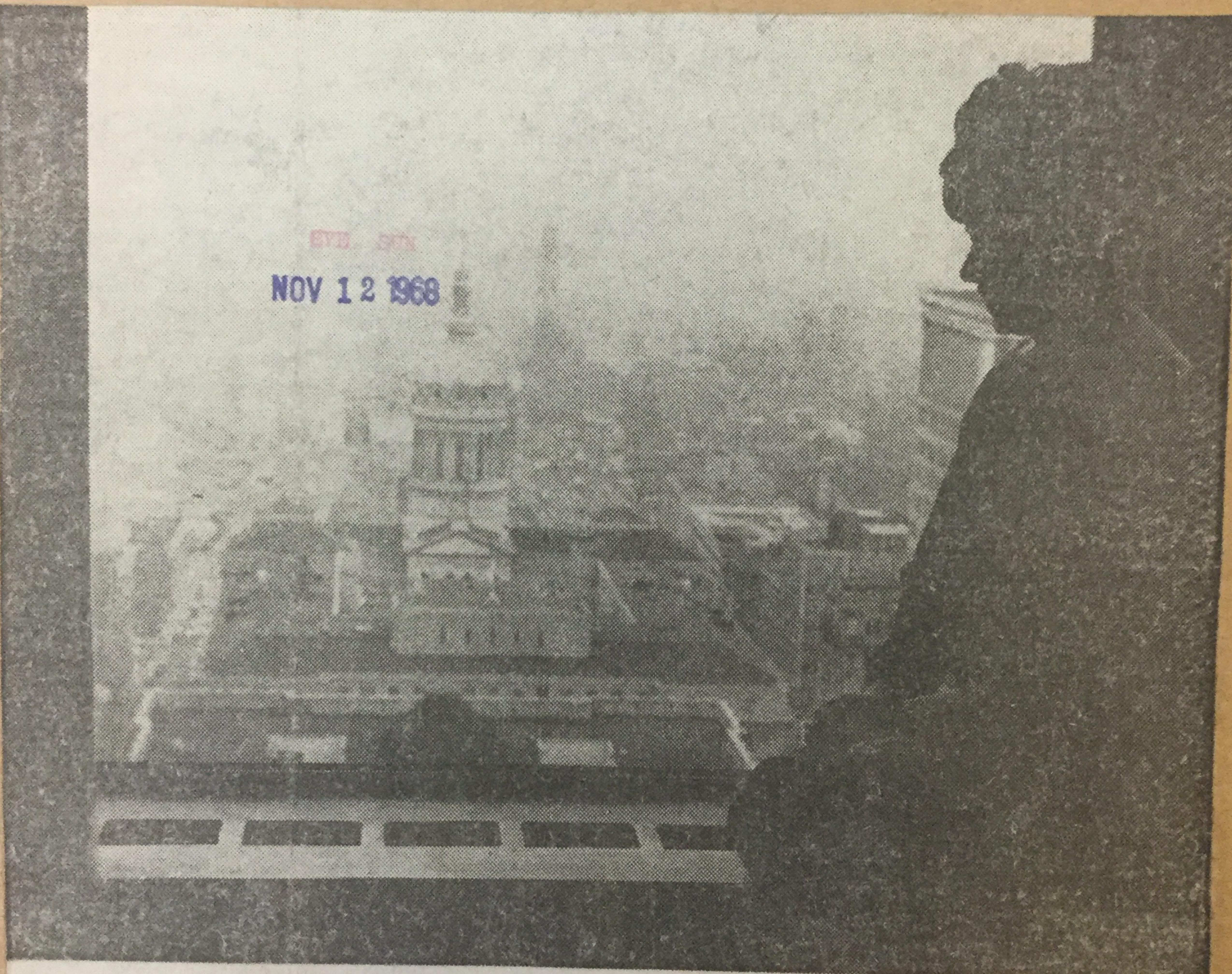
As for other pollutants known to be in the air we breathe here, Mr. Schueneman estimated that:

"Limited available data indicate that average daily concentrations range up to more than two times higher than desirable levels on some days of the year.

"Carbon monoxide exposures of persons who spend their working days driving a motor vehicle, like a taxi or a bus, in the central Baltimore metropolitan region are in the range of two to three times as high as they should be."

As for other pollutants known to be in the air here, Mr. Schueneman said he couldn't even guess about those pollutants because there are not enough measurements available to make even estimates.

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THROUGH A SHROUD OF SMOG—A secretary at One Charles Center strained her eyes through a hazy smog one day not too long ago trying to see City Hall, which is behind the smoke. It is a graphic illustration of air pollution.