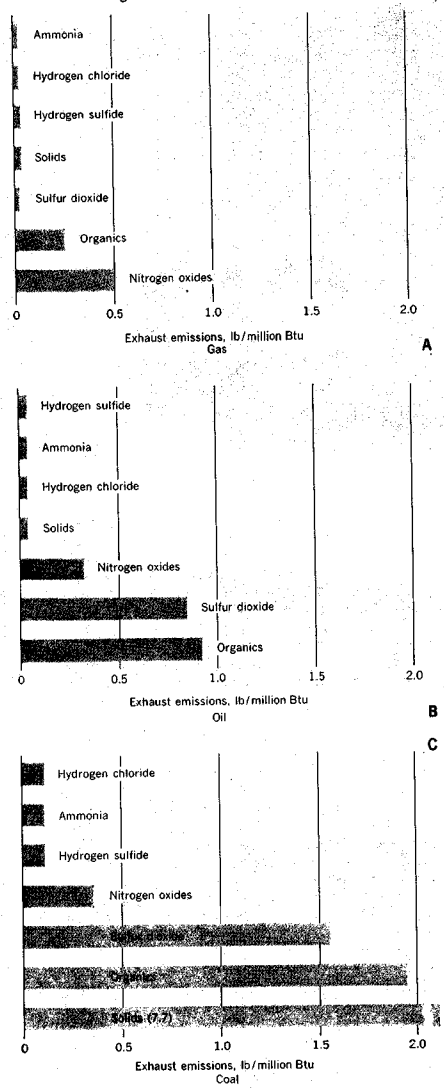
Fig. 7. A—Chart of exhaust emissions from gas-fired furnaces. B—Similar chart for oil-fired furnaces. C—Chart for coal-fired equipment indicates highest contaminant emissions.



will approximately double in rate for each 18°F rise in temperature. While temperature is not usually considered to have an effect on photochemical reactions, recent research has indicated that photochemical oxidant production and the rate of photooxidation of hydrocarbons are accelerated by increased temperature in synthetic smog. And there is evidence to indicate that eye irritants could also be increased in the atmosphere by the elevation of air temperature.

It is known that when the air temperature is raised, the respiratory rates of humans and animals are increased. And the toxic effects of many pollutants are affected by temperature changes. For example, in one experiment, the lethal dose of ozone for rats in a temperature environment of 90°F was 2.6 ppm for a 4-hour exposure; while at 75°F, the lethal dosage for a 6-hour exposure was 6–8 ppm. This would seem to indicate that the permissible levels of air pollution should be revised in accordance with seasonal mean temperatures.

Humidity can influence the effects of air pollution. Its presence often causes more rapid corrosion of metals by certain chemical substances. Many acidic gases, such as sulfur dioxide, nitrous oxide, hydrogen sulfide, and chlorine, are much more corrosive in atmospheres that contain high humidity than they are in the presence of drier air. And since humidity directly affects the heat transfer between humans and their environment, it will, in turn, influence the effect of exposure on humans.

High wind velocity and air turbulence are generally beneficial because pollutants are dispersed and diluted more rapidly.

It is known that sunlight is an important factor in the effects of air pollution since eye irritants, plant toxins, and ozone are formed in the air by photochemical reactions. Air pollution experts are aware, for instance, that some types of soot deposited on motor vehicles will damage the lacquer in the presence of sunlight. If the soot is removed, however, before sunlight can touch the finish, no damage will result.

Atmospheric pressure has a relevant influence in air pollution. The oxygen pressure in the air decreases as the height above sea level is increased. The immediate physiological effect of increased altitude is a more rapid blood flow rate; then, the involuntary rate of respiration increases. As the body adapts to the new atmospheric environment, the concentration of blood hemoglobin rises. The ambient pressure in populated areas of the United States varies somewhat more than 0.2 atmosphere (assuming that 1.0 atmosphere equals about 15 psi). For relative comparison, the instantaneous rate for a given concentration of air contaminant may be expressed as $dx/dt = K$. At a higher elevation, such as Denver, Colo., with a pressure approximately 0.8 of that at sea level, the instantaneous rate would be $dx/dt = 0.64K$, or 36 percent slower. Therefore, pressure considerations are important in establishing standards that are designed to prevent the formation of secondary pollutants that are synthesized by either photochemistry or oxidation from primary contaminants.

Medically, a dim view. Sulfur dioxide is increasingly emerging as a prime villain in the air pollution drama. This contaminant is a major by-product of fossil-fuel combustion from the lower grade fuel oils and coal.

London's smog, a true smoke suspension in fog, has for many centuries been a prime example of traditional air