tive technics for quantitative analysis of inorganic air pollutants. Although chemical methods for nitrogen oxides and sulfur oxides, as two examples, may sound "old hat" to many analytical chemists, there is a particular need to establish more precise laboratory and field methods to distinguish nitric oxide from nitrogen dioxide at low concentrations and to understand more precisely the conversion of nitric oxide in the atmosphere. Renewed interest in sulfur oxides in the air pollution field stems from both epidemiological and laboratory investigations currently under way. One of these epidemiological studies indicates that asthmatics show increased reactions at very low levels of sulfur oxide, and another shows excellent correlation between respiratory infection rates and average sulfate pollution.

Laboratory studies indicate that the physiologic effects of sulfur dioxide are greatly enhanced by the simultaneous presence in the inhaled air of certain particles of size appropriate to deep penetration in the lung. This synergistic effect, it has been found, depends not only on the size of the aerosol—the effect generally increasing with decreasing size—but on the composition of the aerosol. Our abilities to quantify sulfates by size fraction of the particulate are presently quite limited; the solution to the problem involves improved fractionating samplers or improved microtechnics for sulfate analysis, or both.

The fact that pollutants, individually of only minor concern, react in the atmosphere to form new obnoxious compounds of physiologic, economic, and aesthetic interest, adds a new dimension to environmental health investigations. Although it was universally agreed that reactions between pollutants (such as oxidation reactions) did occur, the role of sunlight as an additional source of energy to activate complex chain reaction systems, which create new obnoxious end products, was a concept that emerged from investigations of the Los Angeles smog situation. This work resulted in the now commonly used term "photochemical smog," and established the need for applied investigations with a tool that previously had been more or less relegated to more exotic pursuits in the physical sciences.

Fifteen years of research in this area has indicated that solar irradiation indeed plays a significant role in air pollution chemistry, and even though our understanding has increased many-fold, the questions still requiring answers have increased directly with our knowledge. Deficiencies in our ability to develop practicable methods for the control of the precursors to photochemical smog have further sharpened the need for increased understanding of the detailed mechanisms of smog formation. This is not a simple field for investigation, and it offers a challenge as great as any in the physical sciences today.

Present interest in the application of analytical methods ranges from routine monitoring of community atmospheres to precise laboratory experimentation. Hence the need to adapt and package feasible micromethods into monitoring instruments, and to extend our capabilities for precise quantitation to laboratory studies or to exploratory field studies in order to establish pollutant levels in existing atmospheres, as they relate to the need for additional biological or physical research.

The subject of aerosols or particulates has been touched on in relation to medical research and the development of analytical methods. The field to date has been explored only in a gross fashion for its air pollution significance. Detailed investigations have concentrated on the general physical properties of aerosols, e.g., the effects of size, shape, density, and the like, on settling rates, deposition, agglomeration, optical properties, and so forth.

The suspended particulate fraction for