

halogens, ozone, and sulfur compounds. Lead corroded so rapidly as to be difficult to interpret while iron was shown to be responsive primarily to relative humidity. Fair correlations were obtained with independent measures of pollution level. Some exploratory work was done on the measurement of the electrical resistance of the films. Authors' abst.

- 293 "Invisible Injury" of Bush Beans by Atmospheric and Aqueous Fluorides. H. G. Applegate and D. F. Adams. *Intern. J. Air Poll.* 3, 231-248 (Oct. 1960).

Bush beans, *Phaseolus vulgaris* var. *humilis*, when subjected to either gaseous fluoride or solutions containing fluoride, have abnormal oxygen uptake when compared with similar plants not subjected to fluoride. Plants given gaseous fluoride for 24 hours prior to harvest consistently had greater oxygen uptake than their control counterparts. Plants given continuous fluoride from time of germination had, with the exception of a short period around the fifth day, greater oxygen uptake than their control plants. Between the fourth and sixth days, continuously fumigated plants had a lower oxygen uptake than the unfumigated control plants. There appeared to be little difference in respiration patterns between gaseous fluoride-mediated respiration and aqueous fluoride-mediated respiration. This physiological disturbance induced by fluoride which has been demonstrated is considered to be an example of "invisible injury", by classical definition. -- Authors' abst.

- 294 The Influence of Smelter Fumes Upon the Chemical Composition of Lake Waters Near Sudbury, Ontario, and Upon the Surrounding Vegetation. E. Gorham and A. G. Gordon. *Can. J. Botany* 38, 477-487 (July 1960).

Analyses for sulfate, calcium, and pH have been made on surface waters from 102 lakes and ponds in the Sudbury metal-smelting district, and data are presented for 35 of these. Sulfur pollution is frequently high within 5 miles of the 3 smelters, many ponds exhibiting more than 3 times the sulfate concentration normal for this area, and 3 waters more than 10 times this level. Outside about 15 miles distance the influence of smelter pollution upon sulfate concentrations in surface waters is negligible. As expected, many of the most polluted waters are strongly acid, with pH values going as low as 3.3. Sulfuric acid from air pollution has also led to increased weathering of calcium from soils and rocks, so that this ion tends to rise in concentration not only in waters above pH 6 but also in those below pH 5. Damage to terrestrial vegetation is frequently marked within 5 miles of the smelters, while it is seldom obvious to the untrained eye beyond this distance. Severe damage occurs chiefly within about 2 miles of the smelters. -- Public Health Eng. Abstr.

- 295 Why Industry Needs Performance Standard Zoning. Dorothy A. Muncy. *J. Air Poll. Control Assn.* 10, 282-284 (Aug. 1960).

Zoning controls are required to guide the development of open land in the suburbs which still lack the protection of an air pollution agency. The use of performance standards in a zoning ordinance is a necessary measure to protect vacant land for future industry. Eight trends in industrial land use are significant to the prevention of air pollution and to the protection of land for future industry: 4 of these trends result directly from industrial management decisions and should guarantee the comparability of future plants. The next 3 trends in suburban growth could handicap industry's efforts to improve its location. The 8th trend in suburban growth illustrates the critical need for performance standards in land use zoning. These trends are discussed in detail:—Standards formulated now to guide new industrial growth can be a major preventive measure, until the time when the whole region is protected by a full-scale air control agency. -- APCA Abstr.