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the lipoprotein complex that has been shown to be important for alveolar stability.

Deposition of aerosols in the human lung was comprehensively reviewed by L. Dautechande (Brussels, Belgium) and W. Walkenhorst (Silicosis Research Institute, Bochum, Federal Republic of Germany). The authors' review included experimental human data obtained in their laboratory; such data showed that particles sampled from the deep alveolar air were between 0.05 and 0.4 \( \mu \) in diameter and never exceeded 1 \( \mu \).

The biologic processes involved in the clearance and retention of insoluble aerosols were reviewed by P. Gross (Industrial Hygiene Foundation, Pittsburgh). He separated pulmonary clearance into two processes. The physiologic process that accounts for 90 percent of the cleared dust involves the transport of dust from the alveoli or site of deposition to the pharynx where it enters the gastrointestinal tract. He then described the pathologic mechanism by which dust is transported into the lung interstitium and subsequently to satellite lymph nodes. L. J. Casaret (University of Rochester) postulated that alveolar epithelial cells are phagocytic and may carry phagocytized material into either the alveolar spaces or the interstitial tissue. He further suggested that the rate of clearance of particles from the alveoli is partially dependent on the phagocytic process which is influenced by the physical and chemical properties of the particle.

In a paper which will undoubtedly have an important bearing on evaluating inhalation hazards, C. N. Davies (London School of Hygiene and Tropical Medicine, London) presented evidence showing that the deposition of dust in human alveoli has been much overestimated. Because of the impossibility of making direct measurements, calculations regarding alveolar deposition have been based on respiratory gas exchange. Since aerosol particles possess a coefficient of diffusion negligible compared to gas, the actual aerosol dead space is significantly greater than gas-determined dead space.

New experimental techniques were described in several papers. The apparatus used to measure canine inhalation exposure utilizes a whole-body plethysmograph and shows promise for directly correlating deposition of aerosols with respiratory patterns (B. B. Boecker, Lovelace Foundation). A similar method for rats was used by R. Lie (Lovelace Foundation) to study the inhalation of Cs\(^{137}\). Her data provided an interesting comparison with data obtained in man by whole-body counting techniques (C. E. Miller, Argonne National Laboratory). The longest biological half-lives observed in man were 73 and 84 days for inhaled Cs\(^{137}\)SO\(_4\), as compared with about 13 days in rats for inhaled Cs\(^{35}\)Cl and Cs\(^{14}\)NO\(_3\).

B. Kahn (U.S. Public Health Service, Cincinnati) reported on the intake and retention of Sr\(^{90}\) and Sr\(^{95}\), as airborne particles, by infants during the period April to July 1963. The intake of Sr\(^{90}\) and Sr\(^{95}\) varied from 3 to 14 pc/day and 0.6 to 1.7 pc/day, respectively. From these studies he computed a daily inhaled air volume, for infants, of 11 \( \pm \) 4 m\(^3\), which is greatly in excess of the generally reported values of 0.8 to 2.8 m\(^3\).

In an examination of the problem of inhaled insoluble plutonium, W. S. Snyder (Oak Ridge National Laboratory) suggested the possibility that over long periods a significant fraction of the retained plutonium may be translocated to the skeleton and that this tissue, rather than lung, might be the critical organ.

A number of papers dealt with the uranium mine problem. H. E. Palmer (Hanford Laboratories) reported on studies conducted at mine sites with a mobile whole-body counter. Measurements of the radon daughter, Bi\(^{214}\), in human beings showed nearly 100 percent retention of inhaled radon daughters during an exposure in a nonoperating mine. However, less deposition occurred when the same subjects were exposed to the air of an operating mine containing diesel exhaust fumes. The difference was attributed in part to the larger particles on which the radon daughters were adsorbed in the operating mine in comparison with the nonoperating mine. In both mines almost all of the inhaled radioactivity was associated with particles less than 0.5 \( \mu \).

Estimates of the radiation dose delivered to human respiratory tracts by inhaled radon and radon-daughter products were carefully detailed in separate papers by B. Altschuler (New York University Medical Center) and by W. Jacobi (Hahn-Neutner Institut für Kernforschung, Berlin, Federal Republic of Germany). Altschuler calculated that the alpha doses to the basal cells of the segmented bronchi would be 30 rads/working year of 2000 hours.
in a mine atmosphere containing 100 pc of radon, 200 pc of total daughters, and 150 unattached daughter atoms per liter. Jacobi's estimate was about 30 percent lower.

G.Saccomanno (St. Mary's and Veterans Administration Hospitals, Grand Junction, Colorado) reported on the incidence of lung cancer among miners on the Colorado uranium mining plateau; he emphasized the difference in tumor cell types between miners and non-miners. In uranium miners, 56 percent of the lung tumors were of the undifferentiated type, primarily oat cell, compared with about 15 percent in non-miners. It was also found that uranium miners contracted lung cancer at an earlier age than non-miners. V. O. Archer (U.S. Public Health Service, Salt Lake City, Utah) also reported that long exposures within uranium mines resulted in decreased pulmonary function; however, other factors such as silica dust, age, and cigarette smoking were also implicated.

The work at Hanford Laboratories on inhaled Ce"O and Pu"O in beagle dogs was reported by B. O. Stuart and J. F. Park. Deposition of 2 mc Ce"O resulted in lung damage and death 8 months after exposure. The most consistent effect of inhaled Pu"O in dogs is an absolute lymphopenia. Other later effects include blood-gas changes and right heart enlargement. Four dogs that died 3½ to 4 years after deposition of 5 to 10 \( \mu \)c Pu"O showed bronchiolo-alveolar tumors. (Both papers were progress reports of long-term studies.)

Papers by I. Schmidtke (Robert-Koch-Klinik, Freiburg, Federal Republic of Germany), F. Gensicke (German Academy of Sciences, Berlin, German Democratic Republic), and E. G. Tombropoulos (Hanford Laboratories) illustrated the effectiveness of certain chelating agents such as diethylentriaminepentaacetic acid and hexametaphosphate in removing the inhaled radionuclides, Ce" and Y". It was stressed that work on the development of therapeutic procedures for removal of inhaled radionuclides has been long neglected and further work is urgently needed.

Lung models were discussed by a panel composed of J. N. Stannard (University of Rochester), G. L. Helgeson (General Electric Company, Pleasanton, California), H. A. Kornberg (Hanford Laboratories), K. Z. Morgan (Oak Ridge National Laboratory), H. Schulte (Los Alamos Scien-
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William J. Bair
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October

23-25. Experimental Gerontology, symp., Basel, Switzerland. (Prof. Verzar, Inst. de Gerontologie Experimentale, Nonnenweg 7, Basel, Switzerland)

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