MDS Alerted to Chemical Hazar

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NEW YORK—Dr. Janette Sherman, internist/oncologist at Wayne State University, Detroit, wasn't a scheduled speaker at the recent N.Y. Academy of Sciences meeting on environmental chemical health hazards, but her "discussion"

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was among the most provocative at the week-long session at the New York Hilton Hotel in Manhattan.

Dr. James S. Taylor, dermatologist at the Cleveland Clinic, had just completed his presentation on chloracne, replete with the requisite slides of backs, axillae, fingernails, faces, and balding pates disfigured by industrial chemicals either topically or systemically encountered.

Dr. Sherman walked over to the discussion microphone. **"I have just recently seen four women in their thirties, diagnosed systemic lupus erythematosus by four different physicians. All four patients had been engaged in the production of plastic auto parts for subcontractors to the major auto makers,"** she said. **"Two of these women worked in the same shop. All have shown improvement in their joint pain, liver function tests, acne, ascites, and hyper-pigmentation, mainly of the nails, since leaving their work places. I saw these patients in consultation as a referee for employment disability compensation. All four, I believe, were misdiagnosed after inadequate history-taking by their physicians. Have you any suggestions on this problem?"**

MDs Can Buzz OSHA

Nobody did. After the session, Dr. Sherman was asked whether she had learned of a chemical common to the four cases. She replied that she had not, but that what she had heard in the meeting of the effects of the halogenated aromatic hydrocarbons made her suspicious.

Though different states have different laws concerning damaging exposure to occupational compounds (A Michigan investigation, according to Dr. Sherman, requires that at least five personnel have complaints under any one roof), MEDICAL NEWS learned that physicians who suspect an occupational hazard need only obtain a complaint from a single worker and file it with the Occupational Safety and Health Administration in Washington. Federal investigators can then obtain a complete rundown of the end- and intermediate materials with which a patient and co-workers have been coping. The claim of proprietary secrecy cuts no ice with the agency, and full disclosure is required.

What, then, is currently known about exposure to the large class of widely used compounds in which chlorine or bromine atoms are linked to phenolic and benzene skeletons? Can these be graded as to risk and varying tolerances established both in the factory and relevant to discharges such as have been ubiquitous with the polychlorinated biphenyls (PCBs)?

PCB-Linked Skin Changes

The answers to these important questions aren't yet in, but the darkening and thickening of the nails that Dr. Sherman noticed in her Michigan plastic workers are also a notable feature of prolonged exposure to PCBs. This was reported at the conference by Drs. Alf Fischbein and Albert Miller. They are part of the environmental task force at New York's Mount Sinai School of Medicine, led by Dr. Irving Selikoff, today's dean of workplace toxicity and the guiding spirit of the recent international conference here that cost industrial and government sponsors close to $175,000.

Dr. Selikoff, who appears to be widely trusted by industrial violators of his principles and whose typical comment runs, "Even if they don't want to clean up, they're going to have to stay in business," managed to convince General Electric that his group should take a look at the workers in the Hudson Falls, N.Y., capacitor plant that had been leaking PCBs into the river 50 miles or so north of Albany for 30 years with a state permit to do so.

14% Lose Vital Capacity

Dr. Fischbein reported on 326 Hudson Falls GE workers exposed to four different formulations of PCBs (all trade-named Arochlor) as the dielectric component in the capacitors they were assembling. Most of the 326 workers were over 30 years old and had more than 15 years of experience in the plant.

The Mount Sinai investigator found that 76 of 168 men in the work force complained of rash or a burning sensation on the skin and that 20 had hyperpigmentation and thickening of the fingernails. Acne was fairly common in men over 50 with prolonged exposure, and the incidence of erythema and skin/nail pigment changes ran 13.3% and 10% respectively, Dr. Fischbein reported. He said the skin condition of the workers offered a reliable index of the metabolic disorder.

Dr. Miller, reporting results of spirometric tests on the same cohort of GE workers in Hudson Falls, found it remarkable that 14% had a 20% reduction in forced vital capacity but that only one of the 34 workers showed any roentgenographic changes. There was little chronic bronchitis and only a 6% incidence of interstitial infiltration in the group, Dr. Miller said.

The Mount Sinai physician said tests showed that reduced vital capacity in these PCB-exposed workers could not be ex-



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rds to Health

cribed to the usual airway obstruction and that it was more severe than that found in the Mount Sinai studies of polyvinyl chloride monomer workers. Dr. Miller observed that Scandinavian scientists had previously called attention to the localization of PCBs and their metabolic products in lung parenchyma. He said that, unlike PVC and asbestos exposure, smoking cigarettes did not seem to play a major role in the respiratory changes seen in the Hudson Falls workers. Both smokers and nonsmokers showed equivalent defects.

Previously, other scientists have called attention to the maddening variability in the response of experimental animals to polyhalogenated hydrocarbons. Thus the exposure of a handful of rhesus monkeys to tetrachlorodibenzofurans (TCDF), known metabolites of PCBs and PBBs and suspected of major responsibility for their toxicity, attracted considerable attention. John A. Moore, D.V.M., of the National Institute of Environmental Health Sciences, reported on the deaths and postmortems of four of the primates, which other speakers had said most closely resembled man in their response to the hydrocarbons.

Toxicity Rampant, Complex

Two of four rhesus succumbed to a single oral feeding of one milligram of TCDF, and an increase of 50% in the dose killed both of two other animals, all four deaths occurring at about one month, Dr. Moore said. Pathologists found a profound loss of lymphoid cells, neoplastic changes in all mucous membranes, thickening of bile duct tissue as well as the classic signs of chloracne. (It later turned out that Wilbur McNulty, D.V.M., of the Oregon Primate Center, had run similar toxicological tests and had gotten comparable mortalities at even lower doses.)

Despite these findings, the question remained as to just what the monkeys died of. Said Dr. Alan Poland, of the University of Wisconsin, "We just don't know yet either the target organ or the immediate cause of death of the animals." Clearly, though, the elucidation of these puzzles will be tricky when one milligram of TCDF produces at least an LD-50. Adding to the problem of hazard are the potent liver enzyme induction effects of the metabolites.

These inductive effects in both man and animals were described by Dr. Joyce A. Goldstein, of the National Institute of Environmental Health Sciences, who said that she and colleagues at other centers have been able to sort out the dozens of PCB and PBB isomers in three classes. There are isomers that produce the classic phenobarbital effect on hepatic microsomal monoxygenases (the cytochrome system) and others that mimic the methylcholanthrene induction pattern. Still others, Dr. Goldstein said, combine the two effects.

In general, she said, the more highly halogenated the isomer, the more potent its effect and the longer it persists. "Certain of the chlorinated dibenzoparadioxins and dibenzofurans, particularly those chlorinated in the 2, 3, 7, 8 positions, are potent inducers of cytochrome P-448 and aryl hydrocarbon hydroxylase, resembling 3-methylcholanthrene but 30,000 times more potent."

10 PPM in Munich Residents

An explanation for the longer duration of the effects was provided by Dr. Goldstein's colleague at NIEHS, H. B. Matthews, Ph.D. He reported that in the rat, 25% of a bichlorinated biphenyl is excreted in the urine, but that only 1% of a hexachlorinated biphenyl is renally excreted. Much slower fecal excretion accounts for the rest.

That such research isn't a mere academic exercise was emphasized by Drs. Marcus and Dora Wasserman of the Hebrew University Hadassah Medical School, Jerusalem. After reviewing the level of PCBs in plankton, fish, and birds (U.S. eagles, 14 parts per thousand in fat; peregrine falcons 2 ppt; herons, 900 ppm), the Wassermans observed that residues in human adipose tissue ranged from 0.8-0.9 ppm in Scandinavia up to 3.5 ppm for Austria, and in Germany 6.8 ppm for residents of Cologne and 10 ppm in Munich.

They urged that young women contemplating pregnancy try to avoid foods known to contain PCBs since they are transported to the fetus via the placenta and to the infant in mother's milk.

From His Scalpel-Like Brush





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