entire earth, so that anyone on the planet could tap into a general power supply just by building a receiver. The concept, needless to say, had flaws. But the research provided valuable data on high-frequency phenomena and on techniques for simulating the effects of lightning.

Tesla's thinking and personal manners had always been distinctively different, and as he grew older, he gradually drifted out of society's mainstream. By the 1930's he had become an oddity. As a young man, Tesla had acquired an inordinate fear of bacteria and of human contact. He frequently wore gloves and, when dining, would wipe each implement with a fresh napkin. He never married. In later years he lived a solitary and hermetic life, ruminating on projects that he could not afford to pursue. According to Smithsonian archivist Elliot Sivowitch, one indication of Tesla's intellectual isolation is that he never acknowledged the work of the greatest contemporary in his field: James Clerk Maxwell.

While Tesla clearly had extraordinary powers of analysis and invention, he was not, after the turn of the century, counted in the handful of leading theoreticians and practitioners of electrical science. Chroniclers may have neglected him in the past, but today Tesla has a dedicated band of admirers eager to see that he is justly acclaimed for his discoveries.

—ELIOT MARSHALL

EPA May Be Redefining Toxic Substances

Agency officials' meetings with industry could be the reason, critics say

Shortly before Anne M. Gorsuch took office last spring as head of the Environmental Protection Agency (EPA), scientists there recommended that the agency give priority attention to two widely used chemicals because they are carcinogenic in animals. Top officials went so far as to draft notices to appear in the *Federal Register* to announce EPA's intention to consider regulating formaldehyde and di-(2-ethylhexyl) phthalate (DEHP).

Although the notices awaited only the administrator's approval, Gorsuch requested that more information on the chemicals be gathered. During the summer, EPA deputy administrator John Hernandez held several meetings which were attended for the most part by industry representatives and agency scientists. No consumer or environmental groups were invited to participate. Last month, an agency official recommended in an internal memorandum that formaldehyde should not be considered a significant risk. Apparently no recommendation has been made on DEHP.

Hernandez says that Gorsuch has not made a final decision on what to do about either substance. But many scientists fear that her indecision, particularly about formaldehyde, indicates a reluctance to regulate toxic substances in general. They are also disturbed at the lack of public disclosure about her decision-making process and the lopsided representation of industry at the summer meetings. Their apprehension is compounded by the belief that Gorsuch is systematically dismantling the agency.

The consequences of the agency meetings with industry have been far-reaching. Roy Albert, EPA's chief health adviser and the head of its Carcinogen Assessment Group resigned in September because he was not invited to the meetings, but last week he accepted an invitation by the agency to return to his post. The apparent secrecy of the sessions and the uncertainty about what information industry presented during the sessions has drawn congressional attention. Toby Moffett (D–Conn.), chairman of the environment, energy, and natural resources subcommittee of the Committee on Government Operations, questions the propriety of the meetings and has planned a hearing on 21 October to investigate the matter. An aide to Moffett's subcommittee, referring to the meetings, said, "That's not playing pool."

Albert, a professor at New York University (NYU) Medical Center's Environmental Health Institute, is troubled by the fact that EPA's decision on formaldehyde appears to be related to the summer meetings with industry. But whether that really is the case is not known. No minutes or transcripts were made of the discussions. Albert said, "There is nothing to sink your teeth into to say that this is the logic and information that [EPA] officials have used. There's no target to shoot at."

In 1978, about 1.1 million metric tons of formaldehyde and 185,000 metric tons of DEHP were produced. Formaldehyde is most commonly used in particle board, plywood, and urea-formaldehyde foam insulation. It also puts the press in permanent press fabrics. DEHP is widely used in plastic products, including building and flooring materials. Both chemicals are carcinogenic in rats.

Formaldehyde and DEHP would be the first chemicals to be classified as an immediate concern under a section of law that may ultimately result in regulation setting. According to the Toxic Substances Control Act, the EPA administrator must act if a chemical "presents or will present a significant risk of serious or widespread harm to human beings from cancer, gene mutations, or birth defects. . . ." Many scientists believe that EPA could not have a clearer candidate than formaldehyde. An EPA official who declined to be quoted by name said, "I find it hard to imagine that we could find a substance to qualify if formaldehyde doesn't."

Don Clay, the EPA official who recommended that formaldehyde is not a significant risk, says, "I think it's a problem but it's not a crisis type of thing. I am setting a high threshold [of evidence needed to regulate a substance]. I'm not bashful about it."

Two studies have demonstrated that formaldehyde is carcinogenic in rats, one sponsored by industry and the other led by Albert at NYU. The only dispute about the studies comes from the Formaldehyde Institute, a trade organization (*Science*, 7 August, p. 630). Arthur Upton, the head of the Environmental Health Institute and former director of the National Cancer Institute (NCI), wrote to several regulatory agency administrators, "If the carcinogenicity of formaldehyde is ignored, it would mean that no agent could be regarded as carcinogenic in the absence of positive evidence in humans."

The Formaldehyde Institute believes that without positive epidemiological ev-

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idence, any regulation of formaldehyde would be premature. It prefers that regulators wait for the results of a $500,000 NCI survey of the medical records of 17,000 formaldehyde workers. The study, which is just beginning, will not be completed for 2 to 3 years. However, according to one epidemiologist, the NCI study will be limited by the inability to obtain accurate exposure data for each worker. The NCI study coordinator, Aaron Blair, says, however, that the study should provide useful information about the incidence of more common cancers, such as lung or prostatic cancer, among the survey group. The study probably will not be sensitive enough to provide statistically significant data on the incidence of nasal cancer, which is the malignancy that developed in rats tested by industry and NYU.

The Formaldehyde Institute has been energetic and effective in persuading regulatory agencies to reconsider their positions on formaldehyde, even when they appeared to be on the brink of regulating the chemical. One of the Formaldehyde Institute's principal lawyers is John Byington, former head of the Consumer Product Safety Commission. Last summer, the Occupational Safety and Health Administration tried to fire one of its top scientists after Byington wrote a letter to the agency complaining about the scientist's statement that formaldehyde is an animal carcinogen. The proposal was dropped after a congressional hearing on the matter. Although OSHA's official position now is that formaldehyde is an animal carcinogen, the agency apparently has no immediate plans to regulate it. The health division of the Consumer Product Safety Commission was to recommend by 6 October whether to ban the use of urea-formaldehyde foam insulation but the report has been postponed until February, in part because the Formaldehyde Institute questioned the quality of exposure data.

The trade group has gotten more than a foot in the door at EPA, where formaldehyde industry representatives met with EPA officials on 19 June, 28 July, and 14 August. According to documents obtained by Moffett's subcommittee, the first meeting with 23 participants included six members of the Formaldehyde Institute and only one scientist among many outside of government who dispute the industry's interpretation of the data. Another outside scientist, who attended at the request of the Formaldehyde Institute, was Harry Demopoulos, a pathology professor at NYU Medical Center. Last spring Demopoulos told the Consumer Product Safety Commission that NYU's environmental institute had "discounted" an earlier study that showed a mixture of formaldehyde and hydrochloric acid caused cancer in rats. Upton has said Demopoulos' statement is groundless. No scientists from the NYU institute were present at the EPA meeting. Industry participated heavily in the other two sessions as well.

EPA officials, past and present, say that meetings to exchange extensive scientific data are traditionally announced in a public notice. Moffett noted in a letter to Hernandez that, under the law, advisory meetings between agency officials and regulated industries are subject to public disclosure. Hernandez replied in a 6 October letter that no notice was required because the meetings were not rule-making proceedings. He wrote, "[T]he sessions were not formal proceedings, but rather were designed to be free exchanges among the scientists and other technical experts in order to explore fully the scientific and technical issues."

Some of the participants at the formaldehyde meetings say they have been asked by Hernandez not to discuss them and to refer calls to him. One EPA scientist when asked about the sessions said, "I can't talk to you. I'm not a courageous man. I don't want to lose my job."

EPA held similar meetings with representatives of the DEHP industry during the summer. The sessions, which the Formaldehyde Institute has dubbed "science courts," have met with great enthusiasm from industry. James Ramey, board chairman of the Formaldehyde Institute, wrote to Hernandez, "I would be remiss if I didn't take the opportunity to thank you for inviting the Formaldehyde Institute to participate in the first 'Science Court.' I found the forum intellectually stimulating and very helpful in putting a large volume of highly complex data into proper perspective. . . . I predict that the 'Science Court' may be a lasting trademark of this Administration."

As a result of the science courts, EPA's intention to regulate formaldehyde and DEHP is in limbo. The Natural Resources Defense Council hopes to spur the agency into motion in November with a lawsuit charging the agency with failure "to carry out its statutory duties . . . under the Toxic Substances Control Act." Albert, like many others, is not optimistic about EPA's future role in regulation. "The climate has chilled down quite a bit to regulate carcinogens. We're back to square one," Albert said.—MARJORIE SUN

Handler Receives Medal of Science

Philip Handler, who refused to allow himself to be nominated for the National Medal of Science while he was president of the National Academy of Sciences (NAS), was finally bestowed the honor on 11 October. Science adviser George Keyworth and Handler's successor at the NAS, Frank Press, went to Boston to present it to Handler at the Deaconess Hospital where he has been ill since July. In announcing the award, President Reagan cited Handler's research in pellagra as well as his national leadership in furthering American science. Handler, a biochemist, was NAS president from 1969 to 1981. The White House Office of Science and Technology Policy says that additional winners of the Medal of Science will be announced presently.

—Constance Holden

Gilbert May Leave Harvard for Biogen

Biologist Walter Gilbert is taking a year's leave of absence from Harvard University that may prove to be more permanent. He is leaving to become chief executive officer of Biogen, the genetic engineering company which he helped found.

Gilbert is trying to arrange with Harvard to keep a laboratory going in his absence. But the Department of Biochemistry, at present chaired by his colleague and sometimes rival Mark Ptashne, has a rule that only full-time faculty can be members. When his year's leave is up, Gilbert will presumably have to return to the department or resign from it. He is therefore exploring with the university the possibility of keeping a laboratory attached to a different department. "If the biochemistry department doesn't want me I will be somewhere else," says Gilbert.

Starting his scientific career as a physicist, Gilbert switched to biology and won a Nobel Prize recently for co-inventing with Alan Maxam one of the two DNA rapid sequencing techniques. The move to Biogen repre-

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