United States
Environmental Protection
Agency

Office of
Public Awareness (A-107)
Washington DC 20460

Volume 5
Number 7
July/August 1979

EPA JOURNAL

Protecting Against Poisons

Guarding Against Chemical Risks

While many chemicals are essential to our lives and make a major contribution to our economy, the improper use of some of these substances has been a subject of international concern.

As a result the United States and seven other countries have passed legislation in recent years to help control the introduction of new chemicals.

How various laws and regulations to protect against poisons are being administered by the Environmental Protection Agency and other Federal agencies in this country is reviewed in this issue of the Journal, which focuses on toxics.

In addition to a review of the broad fabric of Federal regulation, other articles include:

A report on the President's request for a major new fund to help correct hazardous waste problems.

A new program to require industries to provide pretreatment of toxic wastes before they reach municipal treatment plants.

An EPA program to help school systems check for harmful asbestos in classrooms.

Steps being taken to protect farm workers from the harmful side effects of pesticides sprayed on field crops.

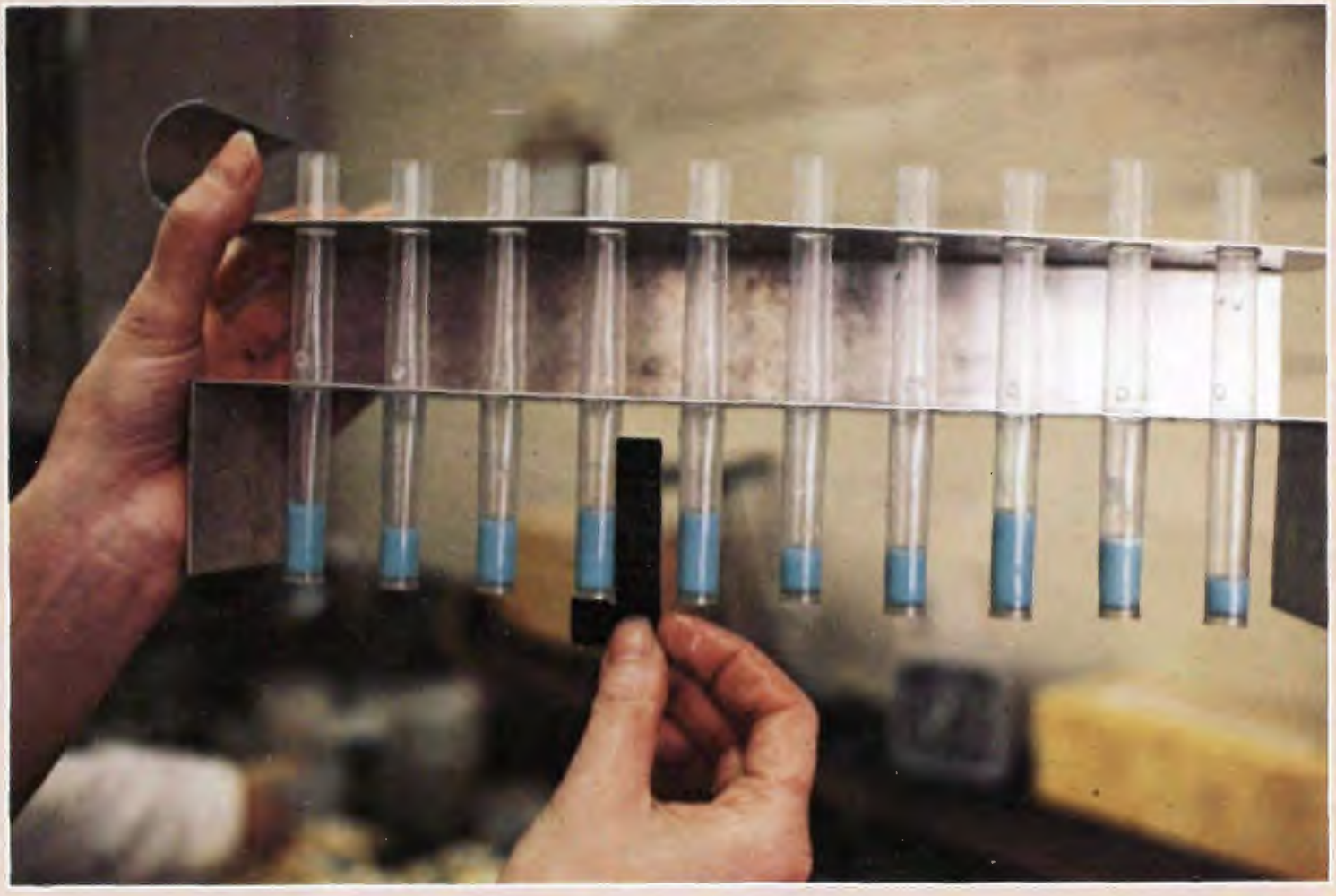
An interview with a leading EPA official on the safety of our drinking water.

Use of biological controls to help stop pests and a report on pests which have developed resistance to chemical sprays.

A report on the uses of poisons through the ages.

A look at the worldwide environmental problems that result from depleting woodlands.

An interview with EPA's Deputy Administrator Barbara Blum about what the Chinese are doing to control pollution in their country. □



United States
Environmental Protection
Agency

Office of
Public Awareness (A-107)
Washington DC 20460

Volume 5
Number 7
July/August 1979

EPA JOURNAL

EPA is charged by Congress to protect the Nation's land, air and water systems. Under a mandate of national environmental laws focused on air and water quality, solid waste management and the control of toxic substances, pesticides, noise and radiation, the Agency strives to formulate and implement actions which lead to a compatible balance between human activities and the ability of natural systems to support and nurture life.

Articles

Departments

Front Cover: A farm laborer picking strawberries in a California field holds a visiting child during a break. (See P.22).

Opposite: Purity tests for bacteria in dairy products are required by food safety laws. (See P.12).

Photo credits: Roger Malloch/Magnum, Ivan Massar/Black Star, Four by Five, Bob Fitch/Black Star, Steve Schapiro/Black Star, Greg Gorman/Meta-4, Ellen Warner/Black Star

Design Credits: Robert Flanagan, Donna Kazaniwsky and Ron Farrah.

The EPA Journal is published monthly, with combined issues July-August and November-December, by the U.S. Environmental Protection Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget

 Subscription $12.00 a year, $1.20 for single copy, domestic, $15 00 if mailed to a foreign address. No charge to employees Send check or money order to Superintendent of Documents, U S Government Printing Office, Washington, D C 20402

Text printed on recycled paper.

International Cooperation in Regulating Toxics

By Douglas M. Costle
EPA Administrator

In the last few years, eight countries including the United States have passed laws restricting the introduction of new chemicals. Others are considering doing so. Such legislation proves that many countries besides the United States recognize the hazards as well as the benefits of the revolution in synthetic chemicals that has taken place since about 1945.

Yet the American legislation is the most comprehensive, and consequently seems to have caused the most concern among non-U.S. observers. Moreover, despite our demonstrated willingness to cooperate with other chemical-manufacturing nations in developing a variety of mutually acceptable standards, some critics charge that the U.S. has gone ahead on its own, establishing procedures which essentially ignore the advice of our major trading partners.

In effect, say the critics of the Toxic Substances Control Act, the U.S. appears to be telling other chemical-manufacturing countries: "This is the way we are going to regulate—we can't wait for you to catch up." They apparently believe that we are using TSCA to shield the American chemical industry from international competition. They believe that, without having had the honesty to admit it, we have erected a new trade barrier that does not depend on import fees, but upon unreasonable and inflexible requirements.

There is no solid basis for such suspicions. In fact, one's perspective of the barrier changes depending upon which side of the border one is looking from. Our own industry claims unfair treatment because our proposed rules for premanufacture notification do not require the reporting of new chemicals contained in imported articles. However, I can understand how the concerns of some foreign nations could arise.

First, it is true that some of the provisions of TSCA do not allow EPA very much discretion. These are not necessarily fixed for all time; but for the present, EPA has absolutely no choice in following many of TSCA's basic mandates.

For example, we are prohibited by law from withholding health and safety studies submitted to EPA under TSCA unless revealing them will disclose process or formulating information. This provision has been the subject of vigorous criticism by companies in other nations. In fact, however, it was one of the most controversial issues during Congress' deliberations on the Act and its resolution was key to final passage. We strongly support this provision and intend to apply it equally to domestic manufacturers and importers. This, by the way, is another issue where U.S. industry argues that they will suffer to the benefit of their foreign competitors. The health and disclosure requirement, they say, will become a one-way flow of information. In effect, they fear that the U.S. industry will become the testing laboratory for the world, at great expense to U.S. competitiveness.

Behind this provision lies much public skepticism about the integrity of American government agencies in regulating private industry. Again and again—with industries ranging from railroads to nuclear power—critics have charged that government and industry have held back from the public information that was used in decisions affecting the public. Against this background, a host of private citizens—many of them as expert in their field as any government or industry specialist—have demanded access to data on which public officials made their decisions. Particularly in the matter of chemicals, these citizens have successfully argued that standards for safety and health have been set too leniently. Working through the courts, they have managed to force government agencies to establish more stringent standards.

Reviewing the record, I believe that many of these citizen actions have been justified. Government today in America—and increasingly throughout the world—functions in an atmosphere of public doubt and concern that requires the disclosure of information.

In TSCA, Congress has directed that we balance the public's right to know against proper protection of confidential business information. Thus we recognize the force of the argument for protecting a company's proprietary interests, and we believe the regulations we have put in place and proposed will safeguard legitimate trade secrets.

Another area in which we have little discretion—because we are following orders from Congress—is the application and timing of requirements under the premanufacture notification provision of TSCA. First of all, under the law these requirements apply to imported substances as well as those manufactured in the United States. Second, when EPA receives a premanufacture notice, it normally has 90 days to review it before the substances can be manufactured or imported. While the period may be extended 90 more days for good cause, this presents a time constraint that domestic manufacturers, importers, and EPA must live with.

On the other side of the equation there are a number of aspects of TSCA for which EPA has been granted broad discretion by the Congress. Some of these are obvious: which chemicals will require testing or other information under certain sections, which chemicals must be regulated, what form of control to require, what tests to require for what effects, and so forth.

However, our test standards are not etched in stone for one generation of Americans to pass on to the next as cherished national treasures. To the contrary, the law requires EPA to review these standards annually for adequacy, and to revise them as appropriate. It is through this mechanism that EPA will be able to adjust its testing standards to take into account agreements reached as a result of the recommendations by the expert groups of the Organization for Economic Cooperation and Development.

We have a number of incentives to develop an internationally consistent approach to the regulation of toxics.

First, regulation works both ways. In 1978, the United States exported a total of $13 billion worth of chemicals. We imported about $6.6 billion. We expect that surplus of exports to be about the same or even better this year. In a Nation whose trade deficit in 1978 was $45 billion, any opportunity to earn $6 billion or more in trade is clearly important. We do not want to jeopardize this favorable balance by promulgating regulations that seem arbitrary to other nations, just as we do not want them to do this to us.

Second, we do not want to fence ourselves off from non-U.S. chemicals because—in doing so—we might deprive our own citizens of a new product with enormous value to health, convenience, or commerce. Much as we might like, in the interest of the national ego, to believe that American scientists are the best in the world, we recognize that they have no monopoly on chemical innovation, and we are anxious to secure for our citizens the benefits of scientific discovery no matter what the source.

Third, we recognize that other countries will be developing useful data which will be of value to us in assessing the risks of chemical substances. With the scarcity of testing facilities and personnel, it makes sense to work toward exchange of data rather than duplication of costly testing.

In short, we see no advantage—and some *dis*advantage—in treating chemical manufacturers from other nations more rigorously than we treat our own companies. Apparently, some non-U.S. manufacturers fear that American companies will have an advantage in dealing with EPA, for example, in pre-notice consultations for new chemicals. Ten years ago, there might indeed have been some advantage of a

Continued to page 40

Legacy of Poisons

By Chris Perham

Poison. The word calls up an image of skull and crossbones—symbolizing death. This universally-recognized sign of danger warns us to beware.

EPA and numerous other Federal agencies have legislative mandates to control poisons which are transmitted in many ways: food, medicines, cosmetics, kitchen utensils, and even playthings can be agents of illness or death.

Poisons have been killing and sickening people for centuries. In the Second Century B.C., Nicander, the Greek poet and physician, wrote about poisons and antidotes in his poem Alexipharmica. Nicander knew nothing of PCB's, PBB's, and other deadly acronyms that dot our modern landscape. He did know, however, that some substances harm while others heal.

Then as now, poisons were hardly scarce. Plants, animals, and minerals all contain ample sources of deadly materials. The Mesopotamians had a goddess of potions and poisons in the Fourth Century B.C. Ancient Egyptians knew the uses of snake venoms and puffer fish poison.

Toxins, which are biological substances, not synthetic or natural chemicals, appear in water as far back as the Scriptures. Some interpret Moses' parting of the Red Sea as the first known reference to a "red tide," the explosive growth of poisonous algae that periodically menaces the food chain and water supply in many parts of the world. Even with modern scientific analysis, no exact cause can be isolated for this phenomenon, which results in massive fish kills and occasional deaths among people who eat the contaminated seafood.

Deadly air pollution is not solely a product of modern life either. Many of the residents of Pompeii who died when Vesuvius erupted were asphyxiated from the fumes belched by the volcano before the ash and lava covered their bodies. Erupting volcanoes produce many gases including fluorides, sulphurous fumes, ammonia, and chlorine.

A bacterium called *Clostridium botulinum* causes botulism, a frequently lethal disease due to one of the strongest toxins known. Scientists estimate that a single ounce could kill 60 million people.

Yet many substances are benign unless ingested in very large amounts. An old Hindu proverb says, "Even nectar is poison if taken to excess."

Some toxics are elements that, in trace amounts, are essential to human nutrition, such as copper and zinc. Arsenic and fluorine can be beneficial in minimal amounts. The toxicity of many substances is influenced by the presence of other elements or compounds that affect the body's mechanisms for absorption, excretion, and metabolism.

The actions of poison on the body can be immediate or long-range. Acute poisoning often is immediate and severe, as a result of a substantial dose or exposure. Chronic poisoning, as a result of lengthy or repeated exposure to smaller amounts of poison, is more subtle and harder to trace to a causative factor. The symptoms may resemble natural aging or mimic numerous diseases. In some cases chronic effects may show after long periods of exposure with no intervening symptoms, or years after exposures have stopped.

In addition to its role as a poison a substance may be a carcinogen, a teratogen, or a mutagen. Chronic exposure to poisonous substances can lead to cancer many years after the exposures have stopped and other signs of poisoning have disappeared. As teratogens, poisons may act on the developing fetus, causing birth defects such as malformed limbs. The mutagenic effects of poisons may be the most lasting because they damage the genetic material, causing irreversible changes that can be passed on to future reproductive generations. On the other hand, carcinogenic and teratogenic effects occur in the bodies of the exposed person.

Benzene is an extremely high volume industrial chemical, amounting to an annual production of some 10 billion pounds. Several toxic effects have been attributed to this compound. Different epidemiological studies implicate this chemical as showing carcinogenic effects in humans exposed to high levels of the chemical in the workplace. It is curious that experimental animal studies have failed to show this effect. Benzene also appears to break the chromosomes, but mutagenic effects have not been noted.

A group of chemicals which have been implicated as producing multiple adverse effects are the metals. For instance, birth defects have been induced by mercury, lead, and cadmium. Both mercury and lead are toxic to the nervous system. Cadmium damages the kidney. There are data indicating carcinogenic effects of arsenic, cadmium, beryllium, and lead. Like benzene, the data on the carcinogenic effects of arsenic are limited to observations in humans, but excess cancers have been reported following occupational and medical exposures as well as general environmental exposures through the drinking water. Various types of mutagenic effects have also been reported for some of the metals in certain test systems.

Exposure to plant and animal poisons has not increased greatly over the years. There are still snake-bites and cases of children eating hemlock (the poison used to kill Socrates), but hardly in epidemic numbers. However, changes in lifestyle and working conditions bring an increasing number of people in contact with poisons that are derived from chemicals and minerals. These are also the substances most likely to fall under government regulation. Following are summaries of some well-known poisons.

Ammonia—This gas with its penetrating odor is common in Nature as a constituent of air, volcanic gases, and the deterioration of animal matter. It was said to have been first prepared at the Temple of Jupiter Amon by Egyptian priests by heating the horns and hooves of animals. During the Middle Ages it was distilled from deer antlers and for this reason has sometimes been called 'spirits of hartshorn.' Pure ammonia was prepared and described by Joseph Priestley in 1774. It is used in cleaning, bleaching, to extract plant dyes, and as a liquid refrigerant. Fumes can be lethal in a few minutes time. The liquid also is dangerous if taken internally, depending on the quantity.

Arsenic—The famous toxic used by the spinsters in *Arsenic and Old Lace* was known in some forms even to the ancient Greeks. It was used as a complexion enhancer and as an ingredient in depilatory preparations by Victorian ladies. Peasants in the Alps believed that arsenic was good for the health and acted as an aphrodisiac, if taken in slowly increasing amounts. Cesare Borgia had a specially-designed signet ring that opened to reveal a compartment for carrying arsenic. Arsenic has been used to treat syphillis and yaws. Small amounts are used as growth stimulators for pigs and poultry. Some is found natu-

Continued to page 35

Safer Pesticides

The EPA is instituting a new program to encourage the development and use of an innovative class of pesticides called "biologicals"—which include bacteria, viruses, and

naturally-occurring biochemicals such as insect sex lures.

These pest-control methods are basically different from conventional pesticide chemicals, which are inherently toxic—one reason EPA has adopted the term "biorational" in describing biological pest-control methods. They work on the target pest by means other than poisoning and thus generally are narrower in the range of life forms they affect.

President Carter underscored the importance of biorational pest controls in his 1976 Environmental Message to Congress, which encouraged pest-management techniques that "emphasize the use of natural biological controls like predators, pest-specific diseases, pest-resistant varieties, and hormones."

The Agency's rules for registering these products are expected to be geared to the special nature of biorational pest-control agents, and thus may exempt them from some tests required for registering conventional chemical pest-control compounds.

"Biorational agents can augment—in some cases supplant—the use of toxic chemicals in controlling target pests without affecting beneficial insects, wildlife, and humans. This makes them extremely attractive from an environmental as well as crop protection point of view," said Steven Jellinek, EPA Assistant Administrator for Toxic Substances. He was addressing the opening of a new California plant for the production of a biologically-based pesticide.

The Federal pesticide law "clearly mandates EPA to take a direct, active role in promoting the development and use of biologically integrated alternatives for pest control," Jellinek added.

Here are some examples of biorational agents that already have received EPA approval for either regular or experimental use:

- *Phytophthora citropthora*—a mold being tested for use against the milkweed vine, a major plant pest in Florida citrus groves.
- *Housefly pheromone*—a female sex attractant used to confuse the male housefly and help limit reproduction. Approved in 1974 for commercial use.
- *Agrobacterium radiobacter*—a benign strain of bacteria that takes over a plant, preventing killer bacteria from getting a toehold. EPA approved this biological agent earlier this year for use against "crown gall," a disease that now destroys 10 percent of nursery fruit trees on the West Coast.
- *Nuclear Polyhedrosis virus*—one strain helps kill the Gypsy Moth, which can defoliate whole forests. Approved in 1978.
- *Cytokinin extract of seaweed*—by supplying an extra dose of a natural plant growth regulator, this chemical produces bigger tomatoes. Approved in 1977.
- *Bacillus thuringiensis*—a bacterium that controls many fly and moth larvae. Originally approved in 1962.

EPA experts emphasize that while promising results have been obtained, none of the biorational agents represent a true panacea for all pest-control problems. They can help control pests, but in many cases other methods—such as conventional chemical pesticides—also are necessary.

Unlike traditional pesticides, biorational agents are not innately poisonous, thereby threatening other "non-target" forms of life. They usually affect only a single pest. Their weapons range from diseases to defensive tactics against crop invaders.

While they have potential advantages, biorational agents now comprise less than one percent of the 35,000 pesticide products sold in the United States. Nine are registered by EPA, and nine more are being tested under experimental use permits. (EPA has not regulated anti-pest predators—such as ladybugs used against aphids—under the Federal pesticide law, and plans to formally exempt these from regulation in the future.)

With a policy statement issued in May for public comment, EPA set forth a framework for speeding approvals of new biorational products—thus helping to get them into users' hands faster than otherwise might have been the case. The Agency will "take into account the fundamentally different modes of action of biologicals and the consequent lower probability of adverse effects from their use," the statement said.

In implementing the policy, EPA is developing guidelines that spell out testing requirements for registering biorational pesticides. These should be proposed by January, 1980.

Also, with EPA funds the American Institute of Biological Sciences is creating a panel to recommend testing to weigh possible human health hazards of biorational pesticides. This panel is expected to consist mainly of experts from the medical microbiology and protozoology community. The recommendations are expected by January, 1980, and will assist the Agency in drafting human safety testing guidelines for biorational agents.

Critics have charged that EPA has made it unnecessarily difficult to register biorational agents. The Agency, according to these critics, applied the same rules used for conventional chemical pesticides, requiring costly, and unneeded tests by developers and producers of biorational products.

EPA's new approach represents a "radical departure from the past," Jellinek said, "when the Agency often required much of the same testing and other data for biorationals that it required for conventional chemicals."

"I am confident that the steps we are taking now will resolve this situation, and further stimulate private-sector interest in developing more of these products," Jellinek said. "These biorational products should become a small but crucial element in the Nation's pest-control arsenal, and we are recognizing them as such." In his California speech, Jellinek cited three reasons why biorational pesticides should be expanded:

- Increased emphasis on the use of integrated pest management (IPM) strategies for pest control;
- Growth in scientific evidence pointing to possibly serious health and environmental hazards caused by exposure to some of the most widely used toxic chemical pesticide compounds.
- More and more signs that many of the most damaging pests—the cotton bollworm far from alone—have become steadily more resistant to conventional chemical pesticides.

"Certainly there still will be a great deal of room for innovation in the development of ever safer, more effective conventional chemical pesticides," Jellinek noted.

Jellinek doesn't see the biorationals as just bugs battling bugs. "They can play a major role in a systems approach that employs a variety of pest-control methods ranging from creatures to chemicals to computers."

This system method—integrated pest management—includes both the use of natural controls and synthetic chemicals among the farmer's pest-control tools. "IPM means more emphasis on a variety of techniques for pest *control*—not *eradication*," Jellinek said.

Because the IPM approach takes into account the total environment of a crop, there will be more and more ways for a narrow-spectrum, biorational pesticide to fit in," Jellinek said. "As pest control becomes more and more scientific, this new generation of pesticides should be an indispensable tool in helping to get the job done." □

U.N. Warns of Super Pests

Destructive pests are developing resistance to the chemical weapons that advanced nations have been using against them, the United Nations Environment Program warned in its State of the World Environment annual report.

Millions of farmers around the world are discovering the limitations of 'miracle' pesticides against destructive insects, according to the U.N. Food and Agricultural Organization. Although production has been dramatically increased by the use of pesticides, some 364 species of insects and mites have developed resistance to the chemical compounds.

Among the major crops threatened by this development are cotton and rice, two principal cash and food crops in the developing countries. Many species of mosquitoes can now survive DDT and Dieldrin. As a result, malaria is on the upswing.

For the first time, the U.N. has begun pressing for abandonment of total reliance on chemical pesticides in favor of integrated pest management (IPM), which makes use of both biological and chemical approaches to the problem. IPM includes such methods as sterilizing male pest species and releasing them to mate unproductively. It also makes use of new strains of crops with built-in pest resistance, introducing other predators to keep down the pest population, and environmental management of the habitat and breeding grounds of pests to discourage their reproduction.

The UNEP report was released to coincide with World Environment Day June 5.

The report also highlighted three other problems in the global environment this year. One is so-called snail fever disease or schistosomiasis, which now infects 200 million people around the world. The illness is caused by a parasitic worm that is transferred between humans and a species of fresh-water snail, mostly found in tropical zones. Development of dams and irrigation in recent years ironically has spread the disease since this provides new breeding grounds for the snails. The report stressed that drainage of infected waterways, combined with improved sanitation and public health education, offer hope for its eradication. Such measures in China, where more than 10 million persons were afflicted, have nearly eliminated schistosomiasis there.

Another problem is noise pollution, which UNEP says "is escalating so rapidly as to become one of the major threats to the quality of human life."

There are now an estimated 500 occupations which are noisy enough to pose a danger to hearing. Even under the maximum permissible noise level of 90 decibels for an eight-hour working day, stipulated by the United States government, one fifth of the work force so exposed will suffer a disabling loss of hearing, according to the report. The permissible level has been reduced to 80 decibels in the Netherlands. Apart from deafness, noise also can cause temporary rises in blood pressure and heart rate as well as other disorders and symptoms of stress such as irritability and moodiness.

The report also warned that the tourist may be a mobile menace to the environment. International tourist arrivals increased from 140 million to 243 million in the decade ending in 1977, and are still on the upswing. Although this brings economic benefits, especially to developing countries, there is also a backlash. The tourist's presence—the way he dresses, eats, drinks, spends, and conducts himself—can create economic and racial tensions and touch off aspirations for a lifestyle totally out of the reach of those whose country he visits.

In addition, some of the world's most beautiful and culturally significant places are being disfigured by construction of roads, hotels, and other developments. From damaged historical sites in Greece and Britain to pollution of the Caribbean and the South Pacific, the impact of mass tourism is being felt. The report argues that striking a new balance is essential to prevent further environmental harm and to preserve the pleasures of tourism itself.

Copies of the report may be obtained from the UNEP Liaison Office, Room A-3630, 866 United Nations Plaza, New York, N.Y. 10017. □

What's Ahead in Clean Water

An interview with Gordon G. Robeck, Director of the Drinking Water Research Division, Municipal Environmental Research Laboratory, Cincinnati.

What's your view of using commercially bottled water as a way of avoiding organics or bacteria coming out of the household spigot?

Well, if you are not comfortable with the water that you may get in an isolated rural area or for that matter in a city, it's a private matter and you could probably buy water that you think tastes better or perhaps looks better, and I wouldn't blame somebody for doing that.

But generally speaking, I think it's a very expensive way of getting that assurance. It costs you close to a dollar to get a gallon of water that way, but it costs maybe forty cents to get a thousand gallons of water delivered from a central system. In a home you're not likely to use more than one hundred gallons per person per day. The cost of bottled water is very high compared to what can be done in a central system. We have found some bottled waters that do allow growth of bacteria when not stored in a cold container. When stored on a shelf in grocery store or drug store, the water could develop growth. I don't think we have any evidence that pathogens have been found in those circumstances, but it's not a good public health practice as we see it.

Some TV ads have mentioned filter devices that you put on the end of faucets in your household, using carbon filters. Are these effective in cleaning up water?

Well, that's somewhat like the bottled water issue. It's a private matter and they also are relatively expensive compared to using carbon beds at a central location for the whole city. I can't deny that these devices are using the same scientific phenomena for control of carcinogens or the chlorine. You have to start out by saying yes, they do remove the same things that you remove with carbon in a big plant. But, many are very small and thus limited in capacity for any sensible length of time, like several months. Some of them may be exhausted within a matter of a week, and when you have to replace them there's no way of regenerating them practically. So you simply replace them, and you have to pay for that. They cost anywhere from $20 to $100 to put in, in the first place, and it costs maybe $10 or $15 to replace the cartridge. There are ways of doing it a little cheaper than that and there are ways of doing it more expensively. There's quite a range of commercial products available. Some have silver in them and they have been registered with EPA to show that they will do what they claim as far as being bacteriostatic material. The silver impregnated in the carbon is to keep organisms from multiplying rapidly in the home filter unit.

We feel one drawback is simply that they have limited capacity. If you make them real large, the water goes through slowly and takes out chlorine and chloroform very well, but then bacteria begin to grow, particularly if they are in an area beneath the sink where it's warm.

The heavy growth may tend to clog the device hydraulically and second, we're not very

comfortable with people consuming organisms with their water, at that rate.

So generally speaking, we tend to discourage the use of these where there is a good central system that is professionally operated and there is a good surveillance of the quality of water.

Do some EPA officials indicate they favor using granulated activated carbon to remove organic chemicals from drinking water?

We recommended to the Administrator the use of granulated activated carbon in bed form either replacing sand or following sand filters in conventional treatment plants now because it is able to remove a broad spectrum of trace organics at the least cost compared to any other alternatives.

But there are certain types of waters that make it necessary to examine the options you have for reducing organics. In certain locations you may have one or two specific pollutants, and aeration may be the way to do the job. In another place it may be a warm climate like Miami's where you have a lot of color material in the water and thus the biological activated carbon created by adding ozone ahead of the carbon beds may be a sensible thing to do.

There is no one answer to all problems. But, as a starter the granulated activated carbon is the best approach. Of course you have to do pilot plant work in each location to sort out which is the most cost-effective series of treatment processes.

You're doing pilot work here in Cincinnati?

We're doing pilot work here on the Ohio river water and in many other places throughout the United States where there are problem areas.

What is EPA doing in other locations?

We are doing different sized pilot plant testing. There are several where we are doing small column work, such as we're doing here in the Environmental Research Center. There are others in Jefferson Parish, La.; Manchester, N.H.; the Passaic Valley Water Commission in New Jersey and in the City of Cincinnati, where we are doing large-scale pilot plant work, working with the entire plant or with several million gallons a day flow through certain standard module filters. We have tried to have this work going on where there are various kinds of problems, so we get a coordinated national program that will help people or utilities with similar problems in all those areas.

If you have a water source that is really dirty with all kinds of organics and other stuff, do you use all three of these methods in treating the water?

Yes. An example of that is to start with municipal sewage and convert it into drinking water. We're researching it and that work has gone on for many years in this center. It was originally called advanced waste treatment, and we are now working with the City of Denver to see if we can use a series of these treatments or processes to make such water potable, that is, drinkable.

Some critics claim that EPA's proposals to remove organics from drinking water are not justified because the risk to human health hasn't been adequately demonstrated. Could you say how great the risk is and whether the benefits are justified?

In the preamble to the proposed regulation for control of trace organics the administration has articulated the basis for the proposal including the cost and the benefits. In July, 1978, a supplement was published in the Federal Register to update the information, particularly as it relates to the health and the risk assessment. We have established that it's not easy to quantify the health risk, and therefore, we had to project the possibility of cancer being formed from ingesting water with carcinogens in it. The intent is to minimize those carcinogens within economic limits that people will accept.

So it's a matter of knowing which waters have carcinogens and then attempting to treat the water to reduce those as much as possible without losing some other benefit, such as the use of chlorine which coincidentally controls communicable diseases but also forms the carcinogen, chloroform. That kind of a trade off has to be watched carefully to implement the control of chloroform throughout the thousands of systems that we have responsibility for.

Could you comment on the higher cancer rate of the river cities like Cincinnati, Louisville, and New Orleans and the significance of granular activated carbon to control the possible carcinogenic problem?

There have been epidemiological studies to see if there is a relationship between the pollution load in the raw and finished water and cancer rates in those cities. There has been some indication that where heavy chlorination has taken place over many decades, there is a higher cancer rate among the people using that water. Beyond that, it is difficult to say precisely what influence upstream organic pollution has caused on the cancer rates. The effect of changing the chlorination practice or not using it until you have employed granulated activated carbon to take out what we call the mass organics that chlorine reacts with to form chloroform, is difficult to say precisely. But we feel that there is much to be gained by controlling these native compounds (from dead leaves and humus) so that subsequent disinfection, be it chlorine or ozone or chlorine dioxide, will not have much material to react with. This reduces what we call chlorinated or halogenated by-products, which we believe are partly responsible for this increase in cancer rate. So the granulated activated carbon filters are an integral part of the strategy for reducing the rate that may be coming from water.

Does it strike you as ironic that the use of chlorine to eliminate so many dangerous diseases in the early part of the century, typhoid and so on, is now actually suspected of causing other diseases?

Yes, it is not uncommon that one solution to a problem creates another problem. It's awful hard to anticipate all of these, but we must realize that a majority of the 40,000 water utilities use chlorine in relatively modest amounts and on relatively good water and do not have many by-products as a consequence of its use.

It is mainly in areas where there is a heavy concentration of natural organics or industrial and municipal waste water —where people have used more and more chlorine to overcome the tastes, odors, or color in water—that by-products have been excessively formed. Fortunately, that's in a very limited number of places. So that the net benefit of disinfecting with chlorine to control communicable disease over the last six or seven decades has been tremendous.

I do think that we leaned too heavily on chlorine by itself and had not used enough physical means of taking things out first, including sand filters and granulated activated carbon filters. That would have helped tremendously. That's what the Europeans attempt to do. They make their water virtually like good deep ground water before they disinfect it—if they disinfect it at all.

How effectively was the United States able to reduce the occurrence of typhoid fever by chlorinating drinking water earlier in the century?

The death rate from typhoid was very high in 1900 in this country, around 35 per 100,000 persons. But by 1920 it had declined to 8 per 100,000 and by the 1930's the rate was below 1 per 100,000 in large cities. And there were other water-related illnesses that were greatly reduced at the same time. The whole story was one

EPA Tests Home Drinking Water Treatment Units

Do home water treatment devices do an effective job of removing organic chemicals from your drinking water? According to initial tests done under contract for EPA's Office of Drinking Water, the answer is: Sometimes.

Tests on seven home drinking water treatment units showed a wide variation in their ability to remove the unwanted chemicals. Most of these units were designed to remove taste and odor components other than the organic chemicals under test, and therefore the variations were not surprising.

In general, the small faucet-mounted and portable pour-through devices were the least effective. In fact, the non-bypass faucet filter removed only negligible quantities of trihalomethanes (THM's) and non-purgeable total organic carbon (NPTOC), and was therefore removed from testing at the mid-point of the program. THM's are the synthetic organic chemicals most commonly found in drinking water. NPTOC is a general parameter or term used in measuring organics.

Most of the other filters including one stationary and two line bypass models were marginally effective, removing less than 50 percent of the THM's, but one line bypass filter removed over 90 percent of the THM's.

The study, done under contract for the Office of Drinking Water by Gulf South Research Institute of New Orleans, found that THM removal ranged from 6 to 93 percent. NPTOC removals ranged from 2 to 41 percent. Removals of the heavier products of chlorine-organics reactions were variable with increases in some units; only one unit showed a uniform pattern of reduction, averaging 79 percent removal.

Measurements were made for bacteria which are normally present in water and are not known to be a hazard. Researchers found that higher bacteria counts were sometimes found in water that had passed through the filters, although the levels were also lower in some cases. The filters make use of carbon in their filters, and it has been shown that bacteria can grow rapidly on carbon and other surfaces in the absence of an active disinfectant. Three of the units use silver to counteract bacteria, but this seemed to have little effect on total bacteria levels, the study found.

Copies of a fact sheet on the study may be obtained from Frank Bell, Project Officer, Criteria and Standards Division, (WH-550), Office of Drinking Water, EPA, Washington, D.C. 20460. □

of the great achievements in public health in this country.

Incidentally, we have done an analysis to show the economic benefits of using sand filters and chlorination in the Ohio Valley early in this century. The installation and operating costs were quickly paid for within a few years by the benefits realized from reduced disease rates. That is another way of expressing the value of water treatment processes.

You mentioned the Europeans. Are we up front in discovering possible cancer effects from chlorination or were there already studies afoot in Europe coming to the same conclusion?

They have not done similar studies in such depth on trace organics, in relationship to disease. They have been doing much more in relation to cardiovascular disease and the cause possibly being related to inorganics in the water, that is, the hardness or the softness of the water, particularly in England.

But they were able to find chloroform in the waters of Rotterdam about the same time that our analysts were finding it in some of the Cincinnati drinking water. They did not pursue the epidemiology or the toxicology of it as quickly as we did. However, they did much more work regarding the control and treatment of the water to reduce trace organics in general, particularly along the Rhine River where the raw water was so bad they had to do something about it many, many years ago.

Will this granulated activated carbon treatment clean up unpleasant odors and remove the chlorine taste now found in many systems?

Generally speaking, yes, that's what it's been used for all over the world, including this country, since the late 30's. It's been used in one form or another, either powdered as a slurry, or replacing the sand with granulated activated carbon. It's a means of reducing the taste and odor-producing compounds.

The chlorine taste should be minimized for two reasons. First, you take the material out that chlorine reacts with that causes some of the taste, and second, you don't have to add so much chlorine in the last step of your treatment process for disinfection.

That's why some people like to use home filters, to take the odor and chlorine taste out of the water, as well as to make it look more sparkling. They take some of the color bodies out.

What is it about granular activated carbon that performs this miracle? What does the stuff do that such a small quantity of it can remove so many impurities?

Well, it is manufactured by applying heat to coal or lignite in such a way as to create a material with many small pores and still not burn it entirely into an ash.

So a grain of it contains mostly air?

Mostly air, like a sponge.

It has so many surfaces where dissolved organic material can make contact that a certain amount of the material sticks to the carbon.

The organic material doesn't chemically interact, it just sticks to the carbon surface. But you have only so much surface, and after a while it can't hold any more, just as a sponge can't hold water beyond a certain point. Then you have to take the organics off by some other means—in this case by applying heat after you transfer the granular activated carbon to a furnace. Subsequently you put the carbon back in the filter and use it again.

And you can keep reusing it?

Well, you have a tendency to lose some carbon in the transfer from one vessel to another, plus, when you heat it, you have to burn some of it off, so that you lose a certain percentage each cycle. Anywhere from 5 to 15 percent, depending on how well you operate your furnace and your transport system. That's one of the key things we are trying to research and show people in this country that what

we reported from the European experience can be accomplished here, too.

There's been much doubt and speculation about the validity of this economic factor. If you had a lot of loss it could be pretty expensive, so you want to show that various kinds of furnaces can be used to reactivate this carbon and not lose more than 5 or 10 percent.

So dirty old coal does have a way of helping to clean up the environment.

Yes, ultimately. It's not coal when you put it in the filter. It's not charcoal either. It's a misnomer to say charcoal; that's something you use in your backyard barbecue. This is a carefully made product in a furnace at high temperatures, and it doesn't have a lot of things in it that coal has originally.

Gordon G. Robeck

But it comes from coal?

It can come from coal, from wood, from lignite or peat. It could even come from corncobs. But there is a big difference in the end product, depending on what you start with. So manufacturers avoid using certain kinds of coal, if it is to be used for drinking water.

It's been used for years for various foods and beverages. There's a long history of technology on how to use the material.

To purify beverages?

Yes, to purify sugar and whiskey and other beverages. When the food industry prepares water for beverages, they use activated carbon because it helps give a uniform quality to the stock material that they put into the product. □

New Facility to Aid Toxics Research

Toxic wastes have become the object of coordinated research efforts by the Environmental Protection Agency in Cincinnati.

Integrated laboratory research, development, and evaluation of existing and new pollution control technology will be the primary function of EPA's new multi-purpose Test and Evaluation facility at the Mill Creek sewage treatment plant there.

The $2.6 million structure was chiefly funded by EPA's Industrial Environmental Research Laboratory (IERL) and Municipal Environmental Research Laboratory (MERL), with contributions from the Health Effects Research Laboratory (HERL) and the Newtown Fish Toxicology Station.

"The new facility is especially suitable for the assessment of the removability and treatability of toxic and hazardous materials in municipal or industrial wastewaters and sludges," said Dr. David G. Stephan, senior Office of Research and Development official and Director of IERL.

In addition to toxic and hazardous waste research, the facility will support projects from all the above laboratories plus EPA's Environmental Monitoring and Support Laboratory in Cincinnati.

Through a cooperative agreement with EPA, the City of Cincinnati provided the land for the center at no cost for 20 years. The nearby sewage treatment plant, under an agreement with the city and the Hamilton County Board of Commissioners, will provide much of the industrial and municipal sludges and wastewaters needed for the research efforts. In addition, other wastes may be transported or synthesized for those projects requiring materials not readily available on site, according to Dr. Stephan.

Designed with flexible services support and a minimum of fixed experimental equipment, the new facility will give all five labs the capability of working hand-in-hand to assess new and existing pollution control technology and the environmental impact of those controls, with regard to both health and ecological effects.

The facility gives the Office of Research and Development a unique capability to support the program and Regional Offices' efforts to establish standards and guidelines.

Stephan emphasized that the facility will stimulate a close working relationship among the labs, so that a single project may benefit each lab in a different way.

For example, he said, both MERL and IERL may conduct research on identifying toxic chemicals in municipal and industrial wastewaters. The Newtown station could then use the effluents from those projects to assess the environmental impact of fish toxicity, and the HERL could use the same effluents to study mutagenicity, that is, the capacity of a chemical to cause mutants or changes in hereditary material.

"The facility will encourage interlaboratory cooperation and permit an interaction among the labs that has never happened before," Stephan added.

The new facility will also make possible basic and anticipatory research in many areas, including the following:

- The identification of toxic chemicals in municipal and industrial wastewaters and air emissions, and the evaluation of systems for removal of these toxics.
- The evaluation of new treatment approaches for municipal and industrial wastewaters, sludges, and air emissions.
- Evaluation of pollution control methods for combined sewer discharges.
- Development of improved process control methods for waste and wastewater treatment processes.
- Assessment of environmental impacts, such as fish toxicity, of effluents from various wastewater treatment processes.
- Production of municipal or industrial effluents and renovated water for health effects research, such as mutagenicity studies.
- The evaluation of industrial energy conservation methods including uses of wastes as fuels.
- Evaluation of thermal destruction of municipal and industrial toxic and hazardous wastes.
- The field testing of pollutant monitoring or sampling devices.

In addition to the research and development aspect of the new facility, EPA staff will be able to get valuable experience and training on the site.

"The Test and Evaluation site will play an important role in EPA's research efforts, now and in the future, in Cincinnati," declared Francis T. Mayo, MERL Director.

No date has been set to dedicate the new building, but Mayo said ceremonies will probably take place in the fall. □

Controlling Toxics

By Truman Temple

Exactly 100 years ago Peter Collier, the chief chemist at the U.S. Department of Agriculture's Division of Chemistry, decided to do something about the rampant adulteration of foods in the United States. A hodgepodge of State laws provided scant protection. Collier saw the need for Federal action and drafted a bill to provide it.

During the next 25 years more than 100 bills were introduced in Congress to cope with the situation. A handful of measures were approved around the turn of the century dealing with the problem in piecemeal fashion, but the most significant action came in 1906 with enactment of the Food and Drug Act and the Meat Inspection Act.

These were the first important Federal laws in this country dealing with "toxic substances," for they sought to prevent the distribution of consumer products that contained, for one reason or another, some very potent poisons. Prompted in part by illness and death among U.S. troops who had eaten contaminated meat during the Spanish-American War, and later by a series of articles and books on abuses in the meat-packing and patent medicine industries, the laws enabled the government to proceed in Federal courts against injurious food preservatives. They halted numerous abuses in patent-medicine traffic. They prodded food processors into seeking better sanitation and sterilization. But the growth of many industries in the 20th century involving chemicals made it clear that other legislation would be needed and the Federal Government's regulatory role broadened. The Federal food, drug, and cosmetic law was rewritten in 1938 and subsequently amended several times. In addition, many other laws dealing with toxic materials of one kind or another were enacted. Ultimately, five major Federal agencies were created to administer some 15 different laws on the subject of toxic materials.

By far the most active period for legislation was the decade of the 1970's. Measures enacted by Congress during this period have been prompted by widespread public concern over environmental damage, by the consumer protection movement, by lawsuits, and by advances in medicine that stressed the need for preventive steps to shield the public from harmful chemicals, rather than costly clean-up activity after the damage has been done. Part of this philosophy reflected a shift in emphasis within the medical profession in dealing with cancer. Many physicians and research professionals felt that more emphasis should be placed on keeping carcinogens out of man's environment rather than on the "cancer cure" approach. Buttressing this view was the widely-circulated Surgeon General's report that had linked cigarette smoking with lung cancer, heart disease, and other ailments.

The Environmental Protection Agency has played a prominent role in administering many of the new laws dealing with various aspects of toxics since EPA's creation in 1970. The most directly involved of these laws, of course, are the Toxic Substances Control Act (TSCA) and the Resource Conservation and Recovery Act, both enacted in 1976. Others also dealing with toxics are the Clean Air Act, the Clean Water Act, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) of 1972, and the Safe Drinking Water Act of 1974. (Control of toxics under the Clean Air Act is described elsewhere in this issue.)

One of the first problems that confronts someone grappling with this arcane subject is: What is toxic? From a medical point of view, just about everything is if taken in large enough quantities. As the 16th century physician, Paracelsus, has put it, "All things are poisonous, for there is nothing without poisonous qualities. It is only the dose which makes a thing poison." It is because toxics can be so broadly defined, and are so pervasive in our advanced technology, that many agencies and laws are involved in controlling them. However, much of the focus in identifying and controlling toxic substances today is on those that may cause chronic and irreversible health effects like cancer, birth defects, and gene mutations.

(Radioactive materials, though they may be highly toxic to humans, are handled under separate laws for a number of reasons. For purposes of definition, excess radiation is considered a physical insult to the body, while toxic substances are chemical insults. Also, a person may be harmed by radioactive material simply by proximity to it, whereas a toxic chemical would have to be ingested, inhaled or touched by a person to cause harm.)

EPA's task in regulating toxics is complicated by the vast numbers of chemicals that have come into the marketplace in the past three decades. Steven D. Jellinek, Assistant Administrator for Toxic Substances, has pointed out that TSCA empowers EPA to gather basic information on roughly 40,000 commercial chemical substances being made or processed by some 115,000 establishments.

Briefly, the law provides EPA with authority to do these things:

- Review new substances before they are manufactured to identify and prevent unreasonable risks;
- Require reporting of any significant new uses of existing chemicals and limit or prohibit any uses that might pose unreasonable risks;
- Require industry to test certain chemicals and categories of chemicals for adverse health and environmental effects;
- Control the distribution and disposal of any that pose an unreasonable risk to human health and the environment.

As required by TSCA, EPA last June released the Nation's first comprehensive inventory of commercial chemicals manufactured or imported into the United States during the past four years. The list will be updated periodically. An idea of the rapidity with which the whole chemical field is changing and growing is indicated by the number of chemicals on this initial list: 43,278 compounds manufactured or imported by 7,420 organizations since January, 1975.

Continued

Continued

The Resource Conservation and Recovery Act deals with toxics when they are in the form of hazardous wastes being disposed of by society. The 1976 law directs EPA to identify hazardous wastes, taking into account such factors as toxicity, persistence, degradability, potential for accumulation in tissue, flammability and corrosivity. Permits are required for facilities treating, disposing, and storing such wastes. EPA is developing comprehensive regulations for hazardous waste management including guidelines for the development of State hazardous waste management programs. The Act also authorizes EPA and State officials to inspect facilities, copy records, and obtain samples to enforce requirements.

The Clean Water Act controls discharges of toxic pollutants into waterways and lakes by means of effluent standards. Under the earlier 1972 Federal Water Pollution Control Act, EPA established strict limits on the discharge of such toxic pollutants as toxaphene, endrin, PCB's, and benzidene. In addition, under the Clean Water Act, any industry that discharges its wastes into a municipal treatment plant must pre-treat its effluent so that it does not interfere with the plant's operation. (A more detailed article on this subject appears on page 17 in this issue.) EPA published a list of 65 toxic pollutants last year and may add to the list, as authorized by the law. Each toxic pollutant listed is subject to effluent limitations, using best available technology for clean-up.

Finally, the Safe Drinking Water Act of 1974 provides for the protection of drinking water supplies from intrusion by toxic wastes through national drinking water quality standards. The Act calls for studies of contamination by cancer-causing chemicals, a task in which EPA's laboratories play a major role.

Federal regulation of toxics, however, is not wholly the responsibility of EPA. In addition to the Food and Drug Administration, which administers the Federal Food, Drug and Cosmetic Act, and the Fair Packaging and Labeling Act, there are several other agencies involved in toxics.

The Department of Labor's Occupational Safety and Health Administration (OSHA) has responsibility for setting permissible levels of exposure for toxic substances in the workplace. It enforces these levels through workplace inspections and provides training and education concerning dangers posed by toxics to workers. The major law under which OSHA functions is the Occupational Safety and Health Act of 1970.

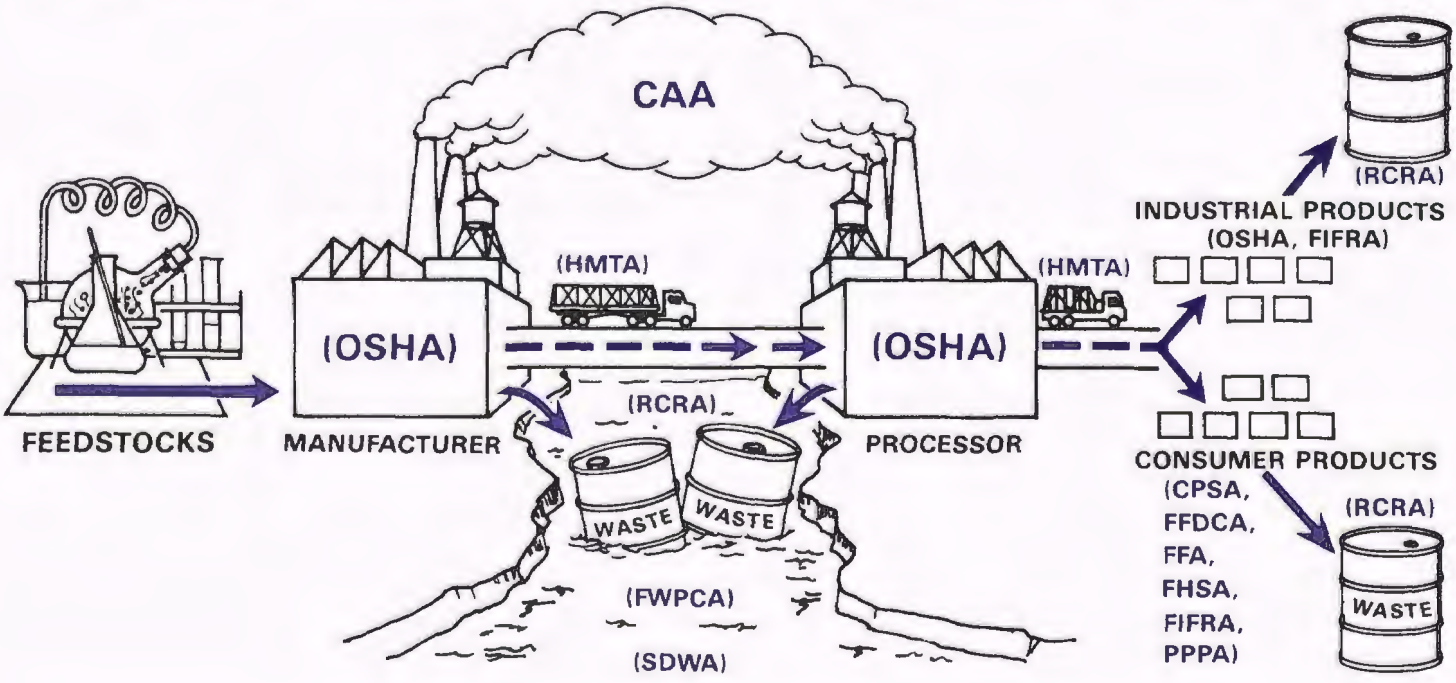
The Consumer Product Safety Commission is responsible for protecting the public from unreasonable risks of injury from consumer products, some of which may be chemical. The Commission derives its authority from the Consumer Product Safety Act of 1972, the Federal Hazardous Substance Act and the Poison Prevention Packaging Act of 1970, and some other laws less closely related to toxic substances.

Also, the Food Safety and Quality Service, established by the Secretary of Agriculture in 1977, oversees the quality of meat, poultry, eggs, and egg products to assure that they are safe to eat and properly labeled.

Other Federal agences also have a hand in the way toxic substances are managed (see box). The Department of Transportation, for example, administers the

Continued to page 19

LEGISLATIVE AUTHORITIES AFFECTING THE LIFE CYCLE OF A CHEMICAL



• KEY •

CAA	= CLEAN AIR ACT	HMTA	= HAZARDOUS MATERIALS TRANSPORTATION ACT
CPSA	= CONSUMER PRODUCT SAFETY ACT	OSHA	= OCCUPATIONAL SAFETY & HEALTH ACT
FFDCA	= FED. FOOD, DRUG, & COSMETIC ACT	PPPA	= POISON PREVENTION PACKAGING ACT
FFA	= FLAMMABLE FABRICS ACT	RCRA	= RESOURCE CONSERVATION & RECOVERY ACT
FHSA	= FED. HAZARDOUS SUBSTANCES ACT	SDWA	= SAFE DRINKING WATER ACT
FIFRA	= FED. INSECTICIDE, FUNGICIDE, & RODENTICIDE ACT	TSCA	= TOXIC SUBSTANCES CONTROL ACT
FWPCA	= FED. WATER POLLUTION CONTROL ACT		

TV Documentary on Toxics Available for Public Television

The Southern Education Communications Association, under a grant from EPA's Office of Public Awareness, has produced a one-hour television documentary on toxic substances titled "Serpent Fruits."

SECA is a public education network of 100 stations in 16 southern States. The film was linked to the Public Broadcast System satellite in June and thereby made available to all public television stations in the country for either simultaneous broadcasting or taping for later use.

"Serpent Fruits" documents the case histories of three individuals whose lives have been dramatically affected by chemicals. The first is a woman who was stricken with cervical cancer and had to have a hysterectomy at the age of 21 because her mother had used a drug called DES to prevent miscarriage during pregnancy.

The second describes the case of a young woman who suffered miscarriages, each within two months of the spraying of the herbicide 2,4,5-T near her residence in the Oregon forests. Over the years she had four miscarriages. After use of this herbicide was suspended in that State she gave birth to a normal son.

The third history concerns a former employee in a plant that manufactured polybrominated biphenyls (PBB's) and who did not use a mask, coveralls, or other protective measures. Two years ago he had to leave work because he was too weak to stand up. In describing his failing health, he wryly remarks that his body contained so much PBB that if he were a cow, he would be shot by the State of Michigan.

The film also features discussions by scientists and industry representatives of the validity of applying animal test results to humans and the difficulty of balancing risks against benefits in society's attempts to regulate toxic substances.

The film was produced by the prize-winning firm of Richter McBride Productions, Inc. of New York. Writer-producer was Robert McBride.

The television documentary was accompanied by the distribution in supermarket racks in June of a League of Women Voters' pamphlet entitled "A Toxic Substances Primer." A one-half hour version of the documentary is being made available as a 16 mm. film to schools and community organizations through Modern Talking Picture Service, Inc., 2323 New Hyde Park Road, New Hyde Park, N.Y. 11040. □

Federal Laws Dealing with Toxic Substances

Statute	*Responsible agency*	*Sources covered*
Toxic Substances Control Act	EPA	Requires premanufacture evaluation of all new chemicals (other than food, food additives, drugs, pesticides, alcohol, tobacco); allows EPA to regulate existing chemical hazards not sufficiently controlled under other laws.
Clean Air Act	EPA	Hazardous air pollutants
Federal Water Pollution Control Act	EPA	Toxic water pollutants
Safe Drinking Water Act	EPA	Drinking water contaminants
Federal Insecticide, Fungicide, and Rodenticide Act	EPA	Pesticides
Act of July 22, 1954 *(codified as § 346(a) of the Food, Drug and Cosmetic Act)*	EPA	Tolerances for pesticide residues in human food and animal feeds.
Resource Conservation and Recovery Act	EPA	Hazardous wastes
Marine Protection, Research and Sanctuaries Act	EPA	Ocean dumping
Food, Drug and Cosmetic Act	FDA	Basic coverage of food, drugs, and cosmetics
Food additives amendment	FDA	Food additives
Color additive amendments	FDA	Color additives
New drug amendments	FDA	Drugs
New animal drug amendments	FDA	Animal drugs and feed additives
Medical device amendments	FDA	Medical devices
Wholesome Meat Act	USDA	Food, feed, and color additives and pesticide residues in meat and poultry
Wholesome Poultry Products Act	USDA	
Occupational Safety and Health Act	OSHA	Workplace toxic chemicals
Federal Hazardous Substances Act	CPSC	"Toxic" household products (equivalent to consumer products)
Consumer Product Safety Act	CPSC	Dangerous consumer products
Poison Prevention Packaging Act	CPSC	Packaging of dangerous children's products
Lead Based Paint Poison Prevention Act	CPSC	Use of lead paint in federally assisted housing
Hazardous Materials Transportation Act	DOT (Materials Transportation Bureau)	Transportation of toxic substances generally
Federal Railroad Safety Act	DOT (Federal Railroad Administration)	Railroad safety
Ports and Waterways Safety Act Dangerous Cargo Act	DOT (Coast Guard)	Shipment of toxic materials by water

By John Heritage

Industrial Pretreatment

The EPA has launched a major effort to curb the flow of toxic industrial wastes which have sometimes destroyed the effectiveness of municipal plants treating sewage.

The Agency has announced a program requiring the cleanup or "pretreatment" of toxic chemicals discharged into the municipal plants from industries.

Treating the wastes before they leave industry is already proving itself in the Grand Rapids, Mich., area. Pretreatment requirements have cut the amount of metals entering the Grand River from the city waste treatment plant by 92 percent. Cyanide levels in the river have dropped from 120 to 4 parts per billion, while dissolved chromium levels have dropped from 340 to 15 parts per billion.

Before industry controls were adopted in Grand Rapids, toxics frequently destroyed bacteria vital in municipal waste cleanup. Fish kills resulted. The industry wastes sometimes interfered with sludge processing. Toxic wastes were found in periodic overflows of the city's sewer system.

Now, the Grand River is a recreational resource, with trout and salmon. Pretreatment is one of the major contributing factors, local officials say.

Many toxic industrial wastes are being discharged into the Nation's municipal sewage treatment systems routinely, day in and day out. Here are some examples:

- Cyanide. It is toxic to all animal life, inhibiting the metabolism of oxygen.
- Hexavalent chromium. It is corrosive, and an irritant. Chronic effects occur in aquatic life as low as .01 to .20 milligrams per liter.
- Cadmium. It accumulates in fish, and in humans in the kidneys. It is believed to be a factor in such conditions as kidney disease, hypertension, and cancer.
- Lead. It accumulates throughout the food chain, and causes brain damage in humans.

"Toxic industrial chemicals in sewer systems can cause a number of potentially serious health and environmental problems," says Barbara Blum, EPA Deputy Administrator. "Some can disrupt the operation of treatment plants on which taxpayers are spending billions of dollars. Others can pass through a municipal plant without receiving adequate treatment. Once in our waterways, many of those pollutants are toxic to aquatic life, are longlasting, can concentrate in the food chain, and are known or suspected cancer-causing agents."

"Toxic pollutants can also contaminate the sludge (semi-solid residue) that results from treating municipal wastewater," Blum said. The need to reuse sludge, Blum warned, is increasing, with mounting volumes of the material.

About one third of the industry waste discharged to municipal treatment plants contains toxic materials, the Agency estimates. Waste waters from the electroplating process alone contain more than 113 million pounds of heavy metals a year. More than 6,500 electroplating plants in the U.S. discharge to city waste treatment facilities.

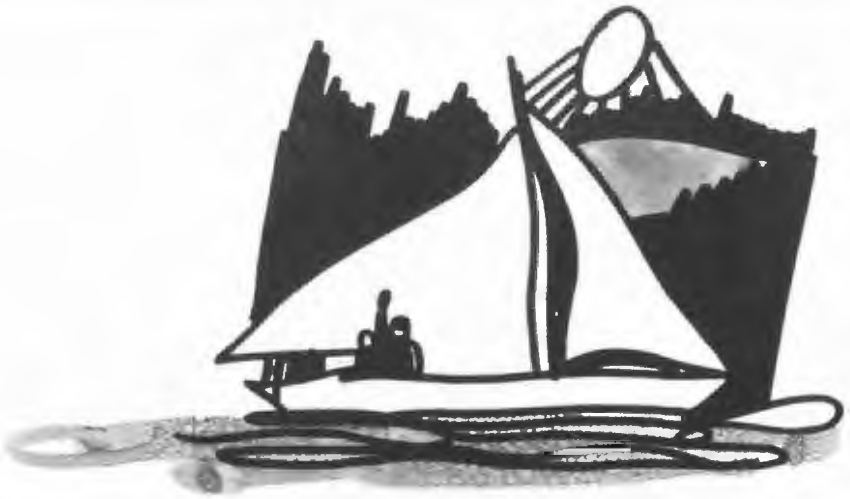
In the New York City harbor area, electroplating contributes 62 percent of the nickel, 43 percent of the chromium, 12 percent of the copper, and 33 percent of the cadmium discharged to several sewage treatment plants.

Under EPA's corrective action, about 30,000 industrial plants will have to clean up the toxic wastes they now discharge into city sewer systems.

The recent EPA step sets the ground rules for the cleanup. It prescribes the ways in which actual pretreatment standards will be enforced. The standards will cover 34 major industrial types, from leather tanning to steam electric power plants, to control discharges of 129 toxic industrial pollutants.

The national toxics pretreatment standards are now being developed by EPA. These standards contain numerical limits on the quantities of specific pollutants which can be discharged by a plant in an industry category.

The Agency is expected to be proposing the standards on an industry-by-industry basis between now and 1981. Among the



first industries planned to be covered are textiles, and petroleum refining.

EPA already has interim pretreatment standards for seven industries discharging some of the most serious pollutants. Those covered include timber products and inorganic chemicals.

In the past it was widely assumed in the water cleanup field that connecting a pipe from the industry to the municipal waste treatment plant would solve all the cleanup problems. For biodegradable wastes it usually worked. But for metals and compounds that do not easily break down, it has not. Tiny concentrations of high-powered substances are escaping treatment and posing an often invisible threat to health and the environment.

To meet the toxics cleanup standards, manufacturing processes could be changed to recycle wastes or use nonpolluting materials. Or economical ways might be found to treat the waste when it is at a high concentration in the industrial plant.

For example, nickel and chrome are sometimes recovered and reused in electroplating. Many wood preserving plants don't discharge. Methods to handle their hard-to-treat wastes include collection and recycling of the leftovers. Also, uses may be found by other firms for an industry's pretreated wastes.

EPA is attempting to ease industries' pretreatment job by demonstrating new technology. The Agency and the National Association of Metal Finishers are testing a treatment system designed to destroy cyanide and remove metals from wastewater without producing a sludge. The first firm results of the test are expected to be available soon. EPA's Industrial Environmental Research Laboratory in Cincinnati is doing the test.

If the demonstration works, the cleanup system should be commercially available to any electroplating shop, said George S. Thompson, Jr., chief of the lab's Metals and Inorganic Chemicals Branch. The aim, Thompson continued, is a waste treatment system that is economical, small, compact, and easy to operate.

Successful pretreatment would bring a big payoff. Fewer toxics in the municipal plants would increase the potential for the reclamation of wastewater and the reuse of municipal sludge. A reduced load of toxics and other pollutants incompatible with secondary waste treatment would improve the chances of smoothly operating city plants. A serious health threat would be eased, and protection strengthened for aquatic life.

The pretreatment program will also bring a price. It will increase EPA's industrial discharge permit program by about 50 percent with no additional resources. Technical tasks will increase; costs will rise; staffing needs will expand.

Under the program, local authorities will enforce the toxics standards. Approximately 600 publicly-owned treatment works will be required to develop pretreatment enforcement programs, including provisions specifically aimed at protecting the quality of sludge. The programs are required for all municipal plants designed to handle more than 5 million gallons of wastewater per day.

EPA is now setting deadlines for the establishment of the local programs. Time limits are being set as a condition of permit renewals for municipal waste treatment systems. Such programs are typically being required within two and one-half years. The Agency is also reviewing pretreatment programs being submitted by the States.

EPA reviews are expected soon for the existing pretreatment efforts of some municipal waste treatment systems that got a head start on toxics cleanup. EPA preparations for compliance investigations are also expected, anticipating the pretreatment standards that should be enforceable by next year. (EPA will enforce the standards until State and local programs are approved.)

Providing backing for EPA's pretreatment action and overall toxics strategy are the Clean Water Act, Clean Air Act, Resource Conservation and Recovery Act, and the Toxic Substances Control Act. A court-sanctioned agreement between EPA and environmental groups brought the actual toxics standard-setting effort.

Other EPA toxics strategies for water quality include control of nonpoint sources such as street runoff, and use of "best management practices" in plants to reduce pollution. Such practices might include installing alarms to warn workers before tanks spill over or sweeping floors to keep waste dry and out of city treatment systems.

Emphasizing EPA's effort to act before the fact, with such measures as pretreatment, Administrator Douglas Costle said, "How much more health-effective and cost-effective it would be if more emphasis were placed on prevention—on keeping harmful materials out of the air, water, and soil—and out of our people." □

John Heritage is an Assistant Editor of EPA Journal.

Toxics Action

On another front, EPA is setting limits on the toxics being discharged *directly* to waterways. The limits will apply to about 20,000 industries and municipalities that discharge toxics in their wastes.

The toxics rules will be made part of the permits that regulate waste discharges to waterways. The permits are being re-issued because the existing ones are expiring. The permits are part of the National Pollutant Discharge Elimination System administered by EPA and the States.

When most waste discharge permits were issued five years ago, water cleanup was focused on traditional kinds of pollution such as solids suspended in the water and excess acidity.

Now EPA, Congress, and the public are also concerned about the generally more dangerous toxics, including Kepone, arsenic, vinyl chloride, and PCB's. As a result, toxics control is a top priority in this second round of waste discharge permits. □

President Seeks New Fund

In response to the environmental problem of hazardous waste dump sites and oil spills, President Carter has proposed legislation to establish a multi-million-dollar fund to help clean them up.

At the same time the President asked for a supplemental appropriation for Fiscal Year 1980 that would include $45 million and add 70 jobs for EPA to investigate and enforce correction of hazardous waste problems. The Department of Justice also would receive $1.2 million and 30 positions to help it conduct investigations and to initiate court actions against illegal dumping or spilling of wastes.

EPA Administrator Douglas M. Costle, in a White House press briefing, said the bill addresses a legacy of neglect in which many thousands of tons of hazardous chemical wastes have been improperly disposed of.

"These sites, with their contents of long-lasting chemicals, now represent time capsules releasing, over time, their toxic contents into our surface waters, our groundwaters, and seriously degrading our landscapes, and that most essential element of our life support system—our water supply," he declared.

"These past abuses represent threats against which our people expect action. This bill is designed to provide that action."

The proposed legislation authorizes $1.625 billion in fees and appropriations over a four-year period. This would include $250 million the first year, $375 million the second year, and $500 million in the third and fourth.

A system of fees on oil refiners and chemical manufacturers would provide an estimated 80 percent of the fund, with the remainder coming from Federal appropriations.

The proposed measure would require government notification of spills and the presence of abandoned hazardous waste sites. It also would provide emergency authority for the government to clean up and mitigate spills and contain the waste at disposal sites. The legislation would permit the government to recover costs of cleanup from liable parties, and provide compensation to victims of oil spills, such as fishermen, for property damage or loss of income from damage to marine life.

The key financing system for the proposal would limit the fees that companies would pay to three cents a barrel for oil and petroleum companies and up to one-half cent per pound on the raw materials used to make petrochemicals spilled and found at hazardous waste sites. Up to $1 per pound would be imposed on frequently spilled non-petroleum-based hazardous substances that also are found at hazardous waste sites.

The Administrator, noting that the legislation still has to go through the usual Congressional process, said that both EPA and the Justice Department were stepping up enforcement activities in the meantime regarding hazardous disposal sites, under existing law, and this is why the supplemental funds in the current fiscal year were requested.

"Both industry and consumers have financially benefited from cheap and unsafe disposal practices in the past," Costle declared, "and therefore both should share in paying for the remedies we must now pursue. However, the legislation contains a number of safeguards which ensure that the burden of the fees will not be unreasonable. Within four years, moreover, the legislation will be carefully analyzed to see if the funding provisions are adequate." At that time a report to Congress, based on the analysis, will include a recommendation on the need for reauthorization.

Costle said a rash of recent incidents resulting from improper disposal of hazardous wastes had made it clear that action is needed to protect public health and the environment. Citing the Love Canal chemical waste disaster in Niagara Falls, N.Y., where more than 200 families had to be evacuated, he emphasized that present authority and resources are a "confusing patchwork" that limit the government's ability to guard the public against waste site hazards. □

Controlling Toxics

Continued from page 15

Hazardous Materials Transportation Act. Last year DOT held hearings jointly with EPA in a move to integrate some provisions of the Act with the Resource Conservation and Recovery Act.

The many laws and regulatory agencies governing toxics have raised concern both in industry and government over the complexities of administration. In response to this problem, a cooperative agreement two years ago created the Interagency Regulatory Liaison Group (IRLG), which now pools the knowledge and resources of five Federal agencies working to control hazardous exposure to toxics throughout our society.

The group consists of EPA, OSHA, FDA, the Consumer Product Safety Commission, and the Food Safety and Quality Service. The formation of this coordinating unit was in direct response to a promise by President Carter to eliminate costly waste and duplication in government.

Through the IRLG, the five agencies are developing compatible testing guidelines and a common approach to the problem of assessing cancer risks posed by toxic substances. When possible, they are coordinating their research as well as their efforts to keep the public informed about hazards to health and safety.

An example was a report, "Hazardous Substances," issued late last year describing actions four of the agencies are taking to protect workers and the public from illness caused by unsafe manufacture and handling of 24 chemical compounds.

"Our cooperative efforts," explained Dr. Eula Bingham, Assistant Secretary of Labor for OSHA, "mean that the government's left hand now knows what the right is doing about these compounds. Instead of duplicating one another's work or perhaps even laboring at cross purposes, we'll be sharing information and research, issuing complementary standards, and conducting joint economic studies to control the dangers from radiation, heavy metals, and pesticides."

Another example of interagency coordination was joint action by EPA, OSHA, and FDA in 1977 to protect farmers, workers, and the general public from possible dangers of the pesticide dibromochloropropane (DBCP). The agencies set emergency temporary standards to limit worker exposure, proposed suspension of crop applications and other uses, and monitored food to make sure the public was not consuming unsafe amounts of the substance.

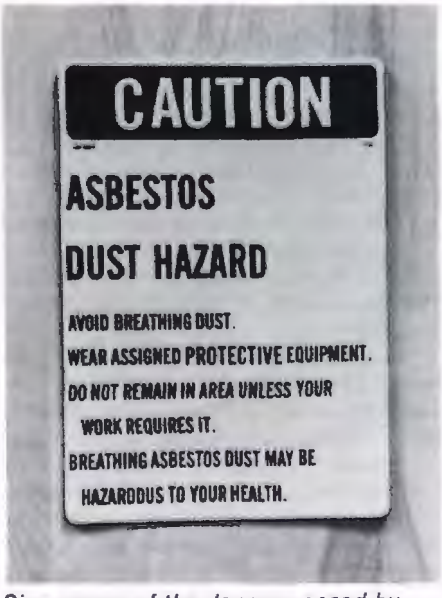
The IRLG carries out its coordination at the Headquarters level in several ways. The heads of the agencies and other senior agency officials meet frequently, and a special senior staff group oversees coordination efforts. Interagency work groups and task forces deal with specific issues and projects.

As Administrator Douglas Costle commented on the IRLG's operations, "The result has been an effective task force which will develop testing standards and guidelines, conduct epidemiological studies and risk assessment, and share information. Our goal is to act as one entity in addressing important life-threatening issues." □

Truman Temple is Associate Editor of EPA Journal.

CONTROLLIN
IN SCHO

Crumbling ceiling materials could be releasing asbestos particles into the air.



Sign warns of the dangers posed by asbestos.

Federal and State governments are moving on several fronts to protect school children and teachers across the Nation from potential exposure to asbestos in school buildings.

Spurred by medical findings in recent years, the Environmental Protection Agency has initiated a program to help educators check their schools for asbestos-containing materials and correct any hazardous conditions which are found.

At the same time a number of members of Congress have introduced legislation for school inspections. A bill reported out of the House Committee on Education and Labor would provide funds for detecting potential hazards and also loans to assist in removal of asbestos materials from school buildings. The Committee last May voted to establish a three-year, $330 million program to assist schools in the problem. The total includes $30 million as grants to school boards to detect asbestos-containing materials in buildings, and $300 million for loans to seal, enclose, or remove the materials.

The measures come at a time of increasing awareness of the health problems associated with asbestos. A National Cancer Institute survey recently estimated that 18 percent of future cancer cases may be attributed to exposure to asbestos. Although the exposure levels found in schools are lower than the past industrial exposures primarily responsible for these grave statistics, there is ample evidence that even these low exposures can induce diseases.

Medical research has uncovered a whole series of illnesses associated with this material among workers heavily exposed to asbestos before the government began to regulate it in the workplace in the late 1960's. According to Congressional testimony last January by Dr. David Rall, Director of the National Institutes of Environmental Health Sciences, a non-smoking worker regularly exposed to asbestos in the pre-regulation period is five times more likely to contract lung cancer than a non-smoker who had not been exposed. Smokers exposed to the material are 50 to 90 times more likely to incur the disease. An estimated 20 to 25 percent of workers exposed to asbestos before the government regulation die of lung cancer, he said.

Dr. Rall also cited the hazards of other asbestos-related diseases, such as asbestosis, a lung illness; mesothelioma, a cancer of the lining of the chest and abdominal cavities; and gastro-intestinal cancer among workers exposed to the material in that period. Dr. Rall pointed out that the degree of risk to pupils in schools around the country is not now known. But research has shown that even families of asbestos workers show development of cancer at higher rates than would be expected for unexposed populations.

The fire-resistant qualities of asbestos have been known for many centuries. The ancient Romans, for example, used it in lampwicks and cremation cloths. But its modern industrial use in the United States

G ASBESTOS OLS

dates from about 1880, and production of the product has been gradually increasing since then.

Because of its ability to endure extremely high temperatures, asbestos in recent times has been employed in a broad range of materials including safety clothing, insulation for wires and cables, rocket nose cones, and most significantly in public buildings. The amount of asbestos fibers being utilized by the mid-1970's represented about seven pounds a year for every person in America.

This material has been used in many types of construction. Between the end of World War II and 1972, asbestos-containing materials were sprayed on walls, ceilings, structural components and pipes in many public schools across the land. The materials were used for insulation and fireproofing, and in some cases decoration. EPA banned the continued use of sprayed asbestos-containing materials in 1973, except for the decorative use, which was not banned until 1978.

Due to the increased concern about low level exposure to asbestos and the realization that several hundred thousand tons of sprayed materials are now present in buildings, a number of investigations of asbestos in schools have been undertaken. A study of asbestos exposure in New Jersey schools, where the material was used in construction, found the substance in about 11 percent of the schools. In addition, asbestos air levels were higher where ceilings or other structures were damaged or deteriorated. Other studies have shown similar results in non-school buildings.

EPA's Office of Toxic Substances, in conjunction with the Department of Health, Education and Welfare and the Occupational Safety and Health Administration, announced the start of a program to help correct this problem on March 16, 1979. EPA's program makes available to all State and local officials, particularly school districts, information on identifying asbestos-containing materials, determining whether hazardous conditions exist, and taking corrective action where required. This information is contained in Guidance Packages mailed to school officials throughout the Nation.

"Identification and sampling of asbestos materials is very simple and can be accomplished in a short period of time by anyone following this step-by-step process," Administrator Douglas M. Costle explained.

"It is important that all asbestos-containing materials are identified by the schools, exposure possibilities assessed, and corrective action taken, to safeguard children's health. We estimate that perhaps as many as 10,000 of the Nation's 90,000 public schools contain asbestos materials. But all of the schools have to be checked."

EPA is also providing extensive technical assistance to help schools identify and correct exposure problems. Regional Asbestos Coordinators and technical field advisors in each EPA Region have been trained and are prepared to assist school officials on all aspects of asbestos identification and correction.

Every EPA Regional Office has available for loan a videotape highlighting the steps needed to identify, evaluate, and correct an asbestos exposure hazard. Regional Offices also are conducting training sessions for interested State officials. In addition, EPA provides assistance on the proper methods for analyzing asbestos bulk samples and the availability of laboratories to conduct such analyses.

Finally, EPA's program includes a survey form to be filled out by school officials. The results of the survey will help the Agency better understand the extent of exposure to asbestos in schools, and the ability of State and local officials to correct any problems encountered.

From the beginning the Office of Toxic Substances has encouraged the participation of the public, other Federal agencies, industry, and environmental groups to prepare the guidance manual and shape the program.

EPA's program relies on State and local response to the guidance it has provided. States are participating by inspecting schools and assisting their school districts with needed corrective activities.

EPA will use the results of the survey and any other data available to determine whether regulations are necessary under the Toxic Substances Control Act. The Environmental Defense Fund filed suit on May 19, 1979, to require EPA to regulate, following EPA's denial of an earlier petition by EDF on this problem.

The legislation currently before Congress would extend the Federal effort in two ways. First, States would be required, if they wish to participate in the loan program, to submit formal plans to a Federal Task Force on how they would conduct inspections and take remedial action. Second, the legislation would provide grants for asbestos detection and loans for hazard elimination.

At hearings on the proposed legislation Rep. Andrew Maguire of New Jersey declared that "deteriorating asbestos ceilings in thousands of our Nation's schools pose a serious, long-term threat of creating additional incidence of cancer among our vast, exposed student population."

Pointing out that New Jersey has the Nation's highest cancer rate, Rep. Maguire described how he had worked with Dr. Rall and Dr. Irving Selikoff, a nationally recognized authority on the health effects of asbestos, in seeking a solution two years ago to asbestos in his State's schools. A study found that safe, effective methods were now available for abating these hazards at reasonable cost, he noted.

"A recent National Cancer Institute survey estimated that at least 18 percent of future cancer cases will be due to exposures to asbestos," Rep. Maguire said. "I do not believe that children in school, seven hours a day, five days a week, should become part of this grim statistic. Clearly something must be done." □

Protecting Field Workers

Thousands of migrant and seasonal farm laborers are now working in fields sprayed with pesticides.

Some of the crops are strawberries, apples, cherries, peaches, lettuce, tomatoes, artichokes, grapefruit, lemons, and oranges, picked mostly by hand. Exactly when the fields, orchards, and groves are sprayed depends on the season and the pest problem.

EPA is acting to protect these and other farmworkers from accidental pesticide poisonings. The Agency's efforts include safety training and restrictions on the use of potentially hazardous pesticides.

In the most recent step, EPA joined with the Department of Health, Education, and Welfare (HEW) in a training program to improve the skills of health personnel in recognizing and treating pesticide poisonings among migrant and seasonal farmworkers.

The EPA-HEW agreement calls for a one-year program "to detect, confirm, manage, prevent, and report on pesticide-related health problems of farmworkers."

"The medical training involved in this program should lead to better, faster treatment for pesticide illnesses sometimes suffered by the people who labor to bring food to our tables," said EPA Deputy Administrator Barbara Blum.

Under the agreement, EPA supports a toll-free phone number for physicians and nurses to get specialized advice in diagnosing and treating suspected pesticide-caused illnesses.

EPA also will have blood and urine samples analyzed for pesticide residues from field workers believed to have poisoning problems. (These services will be provided by universities and State health departments working under cooperative agreements with EPA's Epidemiologic Studies Program.)

The Agency has held a series of training sessions for doctors, nurses, and other medical personnel working in rural clinics funded by the HEW Health Services Administration. To date, eight sessions have been held, reaching 158 health professionals who serve migrant and seasonal farmworkers.

EPA will also provide educational materials, including a manual on pesticide poisonings and a slide/tape series to train health professionals in the diagnosis and treatment of pesticide illnesses.

To increase understanding about pesticide poisonings, the agreement commits EPA to investigate up to 500 suspect incidents from reports from the health clinics. EPA's responsibility includes laboratory services support.

In another action, EPA's Office of Public Awareness has prepared a slide show for migrant farmworkers. The show teaches workers how to protect themselves from pesticide dangers and what to do in case of pesticide poisoning. The program features Efren Herrera, placekicker for the Seattle Seahawks and radio sports broadcaster.

The urgency of the pesticide poison problem is "underscored by the fact that more than a third of all hospital-admitted pesticide poisonings in America today are occupationally related," says Steven Jellinek, EPA Assistant Administrator for Toxic Substances.

"We suspect that many more poisonings go unreported—especially by farmers and farmworkers, who for a variety of social and economic reasons are among the least likely to seek hospital or emergency room treatment following a pesticide poisoning," Jellinek said. "And when they do, we further suspect that a number of pesticide poisonings may go undetected or unreported because the illness is attributed to some other cause."

Adding to the uncertainty is the fact that except in California, there is no mandatory requirement for pesticide poisonings to be reported to State health departments or other agencies. In California, physicians are paid for reporting such accidents.

Migrant workers pause while picking beans.

Opposite: During grape harvest a woman worker carries her share of the fruit from the fields in Delano, Calif.

"We feel it's our responsibility to see that information is more effectively collected and the problem evaluated," says Jellinek. A key part of the answer, Jellinek believes, is to go where the workers are, in clinics and in meetings, with such projects as the EPA medical training project and worker slide show.

"In part in response to the concern that many individuals and organizations—including the Migrant Legal Action Program and the National Association of Farmworker Organizations—have expressed in this area, EPA is supporting a number of special investigations aimed at increasing our ability to effectively deal with pesticide hazards to migrant and other farmworkers," Jellinek says.

EPA-supported projects that can help deal with migrant worker pesticide dangers include:

- The Pesticide Incident Monitoring System (PIM's). The system collects and reports pesticide incidents from worker poisonings to fish kills. About 28,000 incidents have been tallied over 12 years.

As part of the monitoring program EPA scientists answer inquiries, including those from concerned citizens. It was such a letter that was instrumental in EPA's suspension of most uses of the herbicides 2,4,5-T and Silvex.

- A national study of farmworkers exposed to pesticides. With EPA sponsorship, Colorado State University is designing the scientific protocol for this project. A pilot study is expected to be the next step.

- A sampling of 7,000 hospitals to find occupationally-related poisonings. About 12 percent of 3,000 cases thus far are farmworkers.

- A system to report pesticide poisonings treated in hospital emergency rooms, sponsored by EPA with the Consumer Product Safety Commission's National Electronic Injury Surveillance System.

- A study in the field of migrant worker pesticide exposure. Two scientist brothers —Clarence and Emil Owens—have made an on-the-spot study of southeastern U.S. migrant workers exposed to pesticides. The aim was to count and classify adverse health effects, including poisonings. EPA cosponsored the investigation with the National Academy of Sciences. Results are now being analyzed.

- The Epidemiologic Studies Program, analyzing the causes and effects of pesticide-related disease in 12 areas of the country, sponsored by EPA's Health Effects Branch in the Office of Pesticide Programs.

"No one wants to see people made sick by pesticides," Jellinek says. "In the future, EPA is going to do even more to try and prevent this from happening." For example, he explains, the Agency is conducting a "major review" of its pesticide use enforcement standards, which were set back in 1973. "As the problems of pesticide exposure are better understood, I think EPA and others will be in a much stronger position to prevent needless human suffering," Jellinek says. □

Shrinking Forests Threaten Us All

By Erik Eckholm

In the South American jungle, a settler burns a clearing and plants his first crop. In the Himalayan hills, a woman hacks away at living trees to get firewood for cooking dinner. In Central Africa, loggers clear a patch of valuable trees and are followed by land-hungry farmers.

Stick by stick, tree by tree, the world's forest wealth is dissipating. Now covering about one-fifth of the Earth's land surface, forests are shrinking by an area the size of Cuba each year—that is, by more than 50 acres for every minute of every day. The main causes of deforestation are the spread of agriculture, the gathering of firewood, and irresponsible logging.

Although the forest losses are concentrated in Africa, Asia, and Latin America, people everywhere will be affected. Thousands of unique, irreplaceable plant and animal species will vanish along with the lush forests of the humid tropics. Meanwhile, the real prices of forest products—and hence of new housing, furniture, paper, and countless other wood-based goods—are already rising worldwide, boosting inflation rates.

The most severe effects, of course, will be felt by those who live in, around, and downstream from the denuded lands. Efforts to meet the basic social needs of the billion people living in extreme poverty are being undercut by deforestation.

As Indian forester R. Chakravarti writes: "It is often said that the three basic needs are food, clothing, and shelter. But one cannot think of food and shelter without wood." One-third of humanity relies entirely on firewood for cooking fuel. As forests recede, wood becomes more expensive and harder to locate; families in parts of West Africa have been reduced to one rather than two hot meals a day. In some regions of India, families must devote two days' labor a week to the search for firewood.

Forests also affect food prospects through their ecological roles. As the Himalayan hills are stripped bare, the incidence of disastrous floods downstream in India is rising because monsoon rains rush furiously off deforested slopes. Soil washed off denuded hills is rapidly filling in valuable reservoirs as well. Along the edges of the African Sahara, tree cutting has contributed to the transformation of pastures and fields into desert.

As firewood becomes scarce, people begin using cow dung for fuel rather than for fertilizer, depriving croplands of sorely needed nutrients. Thus can shrinking forests be translated into shrinking food supplies.

In long denuded and more arid regions, the hardships imposed by a dearth of trees have long been felt. Now the combination of destructive logging practices and the ill-planned spread of cultivation is even pulling many seemingly timber-rich countries of the humid tropics toward forest-related economic and ecological crises. In late 1977, while pressing for the adoption of a new forestry policy, the Deputy Premier of Peninsular Malaysia shocked his compatriots by projecting that the region's once-lush forests would be severely depleted in just 12 years. He predicted that by 1990 the rate of timber production would not be adequate to meet domestic, let alone foreign, demand. Stringent new logging controls are being imposed in Thailand following the National Forestry Department's estimate that the country's forests are shrinking by 250,000 hectares a year, and that they will be virtually gone in 25 years if present logging and farming practices continue. (Thailand has a special problem with poachers of valuable tropical hardwoods; each year 30 to 40 forest guards are killed in gun battles.)

Efforts to meet both rural and urban housing needs are undermined by timber scarcity. Even in the U.S., with its comparative forest wealth, soaring timber prices are helping to drive house prices beyond the reach of the middle class. But in Pakistani cities, a simple board costs twice as much as in the United States, though the income of the average American is 46 times that of the average Pakistani.

Development planners' ignorance about the importance of forests has been reflected in the paucity of programs to replant denuded landscapes. Quite recently, however, interest in forestry has surged among national leaders and development agencies. For example, the World Bank plans to multiply its support for such activities as village woodlots and environmental rehabilitation, while the U.S. Congress has directed the Agency for International Development to give new attention to forestry.

The major need, many thoughtful foresters are beginning to see, is for the mobilization of rural people to plant trees to meet their own elementary needs and to protect the lands off which they live. Reforestation carried out by deprived people themselves can augment global forest resources as it directly benefits those in greatest need.

The difficulties are legion, but experience has proved that community-based forestry can succeed. China's widely admired forestry accomplishments have been matched in the Seventies in South Korea, where extensive planting by village associations has solved an acute firewood problem. One Indian state, Gujarat, is now defying the common wisdom about India's development constraints by implementing a successful village woodlot program.

By any account, a stupendous number of trees must be planted over the next two decades if massive economic and environmental disruptions are to be avoided. John Spears of the World Bank calculates that at least 50 million acres of plantations must be established by the century's end in Africa, Asia, and Latin America just to meet projected firewood needs. Yet, at current rates, only five million acres, one-tenth of the requirement, will be planted by then.

Even as tree planting programs are pushed, the deeper roots of deforestation must be eradicated. Uncontrolled deforestation is usually a symptom of a society's inability to get a grip on other fundamental development problems: agricultural stagnation, grossly unequal land tenure, rising unemployment, rapid population growth, and the incapacity to regulate private enterprise to protect the public interest. Clearly, the forest problem cannot be solved by foresters alone.

Woodland depletion by firewood gatherers can be greatly mitigated by tree planting, but broader attention to rural energy needs, appropriate alternative energy sources, and national energy priorities is also necessary if more hospitable rural environments are to be rebuilt. The conservation of forest products—by the poor through the adoption of efficient wood stoves, by the rich through increases in paper recycling and reductions in wasteful wood uses—is another part of a long-term solution to the forest problem that requires a broad social commitment. Underlying all the sources of deforestation to varying degrees is, of course, human population growth; more people demand more firewood and farmland in some countries, and more veneer furniture and unspoiled wilderness in others. The sooner population growth slows, the brighter the prospects will be for preserving forests ample enough to meet both environmental and economic requirements. A vast amount of tree planting is essential over the coming quarter-century, but its benefits will be undercut if the deeper roots of deforestation are not eradicated too. □

Erik Eckholm is author of "Losing Ground: Environmental Stress and World Food Prospects" (W. W. Norton, 1976) and "The Picture of Health: Environmental Sources of Diseases" (W. W. Norton, 1977). The above article is excerpted from Worldwatch Paper 26, "Planting for the Future: Forestry for Human Needs."

Mounting Acid Rain

By Dr. Norman R. Glass

Acid rain poses a threat to vegetation, and water quality.

The United States is increasingly turning to the use of coal as the raw material required to meet its burgeoning energy demands. The foremost reasons for this move are:

- We have vast reserves of coal in the Western and North Central States, which we are told will last for centuries.
- Early in the 1970's we were cut off in part from world supplies of crude oil and the same phenomenon is occurring again with increasing prices for crude oil.
- The Three Mile Island incident has created a certain uneasiness about the use of nuclear power.

Because of the growing use of coal, there will be an increase in atmospheric emissions of some or all of the precursors of acid precipitation. This will occur even if the best available control technology is used on both new and old sources of air pollution. This likelihood exists since we will have to convert a number of existing power plants and other users of natural gas and fuel oil to coal. Because of the use of tall stacks in alleviating local air pollution problems, we will become increasingly confronted with the difficulties of acidic precipitation far from initial sources of the air pollution.

Although acid rain is largely an Eastern United States problem, there is increasing evidence that parts of the West and Southwest may also be impacted, at least locally. However, soils in the West are generally alkaline and tend to neutralize whatever acidity falls in the form of precipitation as soon as it reaches the soil.

"Pure" rainfall is naturally slightly acidic because of the presence of carbon dioxide in the atmosphere. The carbon dioxide dissolves in water to produce weak carbonic acid. This natural acid in rainfall is buffered and is partly responsible for the long, slow weathering of soil and rocks. However, stronger sulfuric acid and nitric acids generated primarily by vast quantities of combustion gases from the burning of fossil fuels have been entering our atmospheric environment in increasing amounts in recent decades. Sulfur dioxide from smelters and coal and oil fired power plants, and nitrogen oxides from vehicles and industrial sources are chemically converted in the atmosphere and returned to the earth dissolved in rainfall. These are carried by wind, rain, and snow and are being deposited in such quantities that the neutralizing capacity of some water and soils is being overwhelmed. This causes them to become increasingly acidic.

A commonly used measure of acidity is called pH. A value of pH 1 is very acidic (e.g., battery acid), pH 7 is neutral (e.g., distilled water), and pH 13 is very alkaline (e.g., lye). To chemists, pH (which ranges from 0 to 14) is a measure of the concentration of hydrogen ions and indicates acidity or alkalinity of a solution. The lower the pH value, the more hydrogen ions in solution and the stronger the acid. However, a change in one pH unit (e.g., from pH 2 or from pH 8 to 9) reflects a 10-fold change in acidity or alkalinity. The reason is that pH is on a logarithmic scale rather than a numerical scale. Precipitation is considered to be acidic if it is below pH 5.6, the normal equilibrium value of carbon dioxide in water. The recorded extremes of precipitation vary from pH 2.1 to about 8.

Available data indicate that rain in a large region of North America is highly acidic when compared with the expected pH value of 5.65 for pure rain water in equilibrium with carbon dioxide. The change in pH of precipitation between the mid-1950's and the mid-1970's in the Northeastern United States and Atlantic Canada has been dramatic. Also, acid precipitation has spread measurably south-

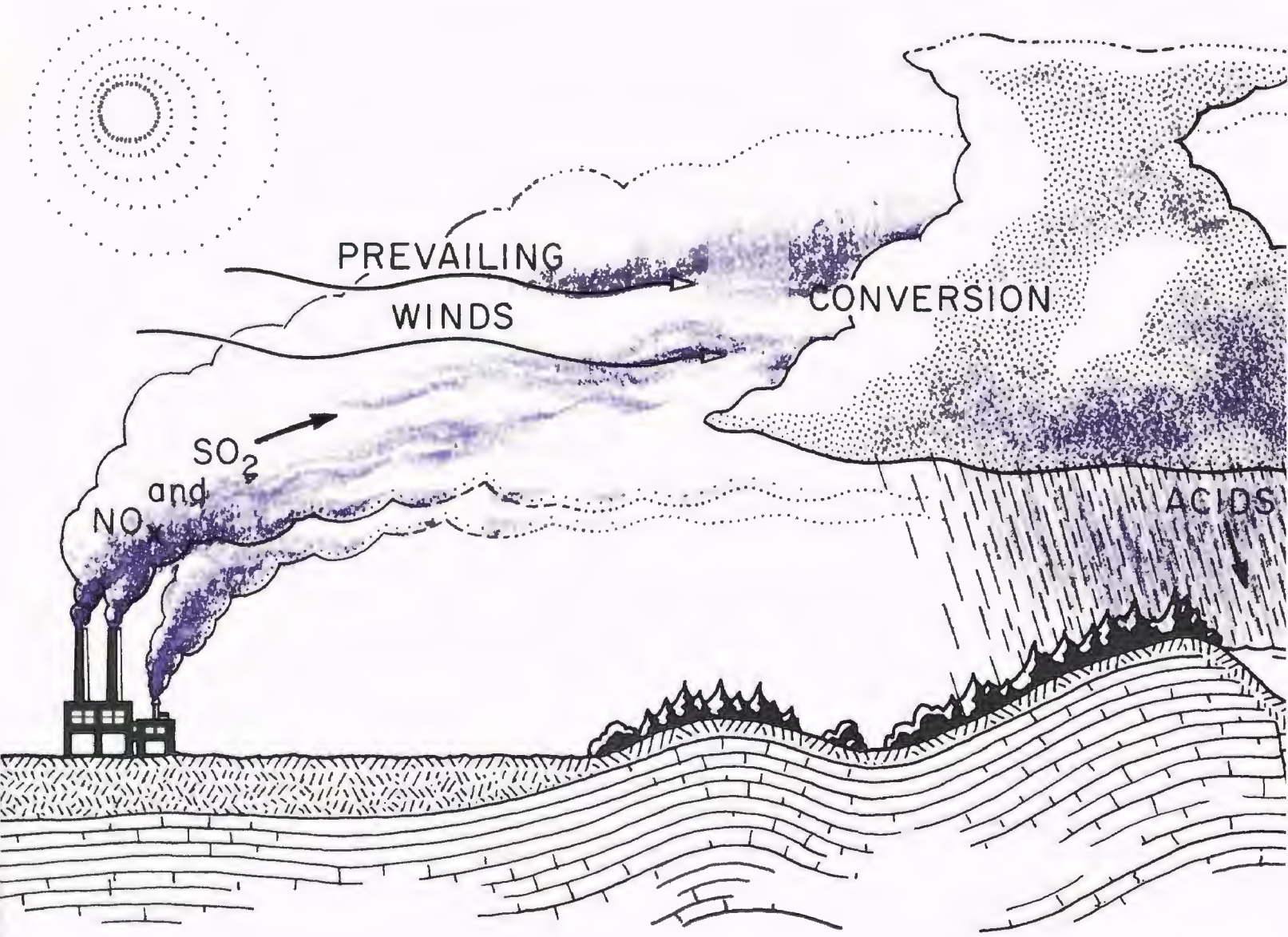
ward and westward in the United States. More recent information indicates that in the South and West portions of the United States pH values between 3 and 4 are observed during individual storms. In the Western United States it is now clear that urban areas are experiencing acid rain, but the chemical composition of the precipitation indicates that automobiles rather than stationary sources such as power plants are the probable major cause.

Although the historical record prior to 1955 on changes in acidity of precipitation is very sparse, data indicate that by the mid-1950's precipitation in the Eastern United States was already acidic, and that the acidity of rain and snow in that region increased significantly sometime between 1930 and 1950.

A growing body of evidence suggests that acid rain may be responsible for substantial adverse effects on the public welfare. Such effects might include the acidification of lakes and rivers with resultant damage to fish and other components of aquatic ecosystems, acidification and demineralization of soils, possible reduction in crop and forest productivity, and deterioration of man-made materials. These effects can be cumulative or may result from peak acidity episodes.

A drop in the pH of precipitation has been observed for many years in Scandinavia. A monitoring network there showed that since the mid-1950's precipitation in northwestern Europe had increased in acidity and that this acidity was currently widespread geographically. The hydrogen ion concentration of precipitation in some parts of Scandinavia has increased more than 200-fold during the past two decades.

Data from New York State and other parts of New England indicate that approximately 60 to 70 percent of the acidity is due to sulphuric acid and 30 to 40 percent of the acidity is due to nitric acid. These



strong acids are thought to stem primarily from gaseous man-made pollutants such as sulphur oxides and nitrogen oxides produced primarily, although not exclusively, from the combustion of fossil fuels. The relative proportion of nitric acid derivatives and sulphuric acid derivatives may be an adequate indication of the nature of the source from which the acid rain was derived—a high proportion of oxides of nitrogen or of nitric acid derivatives would indicate automobile or mobile sources whereas a high proportion of sulphuric acid derivatives would indicate stationary sources such as power plants, smelters, and heavy industry.

The most severely impacted areas appear to be mountain ecosystems because, along with related factors, they receive greater amounts of precipitation (and thus more total acid).

Falling first on the forest canopy, acid rain leaches nutrients such as calcium and potassium from the plant tissues, causes lesions and deformities in the foliage, and erodes the waxy coating which helps protect the foliage against disease and water stress. There is some evidence that leaf metabolism is altered. The moisture continues to the ground where it hastens the leaching of nutrients such as calcium, magnesium, potassium, and sodium from the litter and underlying soil.

Acid conditions inhibit decomposing bacteria so that abnormal litter accumulations and disruptions of nutrient cycling may occur. Nitrogen fixation by certain bacteria is also inhibited. Metals such as aluminum, manganese, iron, mercury, cadmium, and lead are mobilized in toxic quantities and made available for root absorption. Thus, the foliage is assaulted from above while the roots are starved and poisoned in the soil.

Laboratory studies have shown significant reductions in the productivity of plants grown under simulated acid rain conditions. This gives cause for concern about the future health and productivity of timber, maple sugar, fruit, and vegetable crops in the Northeast.

High mountain and upstream lakes with poorly buffered watersheds are rapidly and severely affected. The purest lakes are most vulnerable because the acids quickly consume their very limited buffering capacity and the pH decreases.

Below pH 5.6 the reproductive capacity of adult fish and the survival ability of eggs and young fish declines and eventually fails. Below pH 5 the survival of even large fish becomes precarious. Since all aquatic organisms are affected, the fish must also contend with reduced food variety.

In contrast to reproductive extinction over a period of years, a sudden acid-laden snow melt may kill thousands of fish in a single day by acid shock or aluminum poisoning. C. L. Schofield of Cornell University reports that over 100 lakes in the Adirondacks are now devoid of fish due to increased acidity.

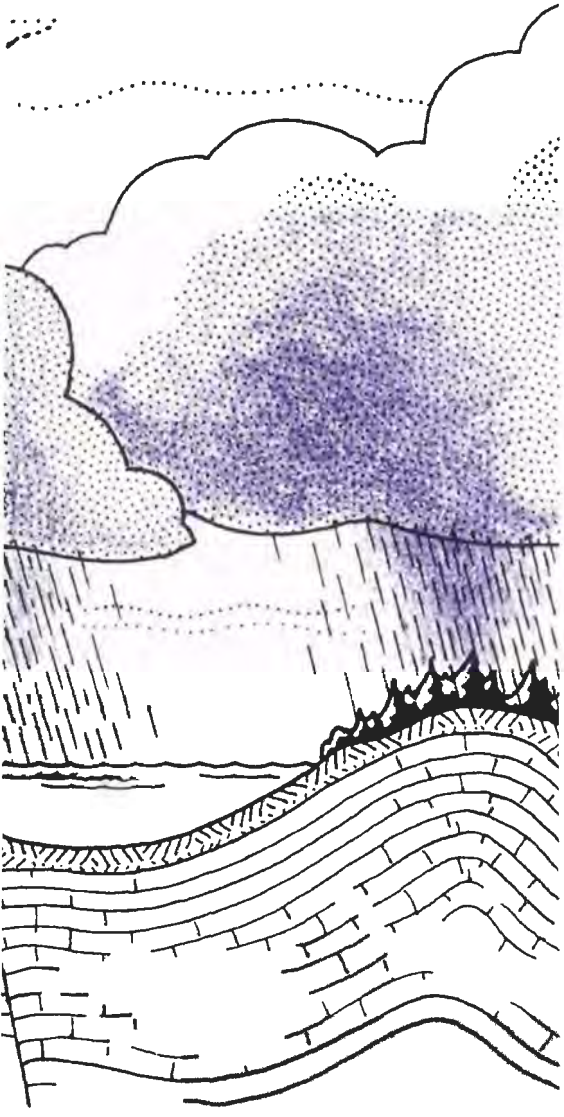
In severely acidified lakes, inhibited bacterial decomposition may cause natural organic litter to accumulate on the bottom, reducing the nutrient cycling and sediment exchange critical to productivity. Peat moss (Sphagnum) often invades the lake, extracting nutrients and producing organic acids which further reduce the pH. Toxic metals from the sediments or watershed may be dissolved into the water.

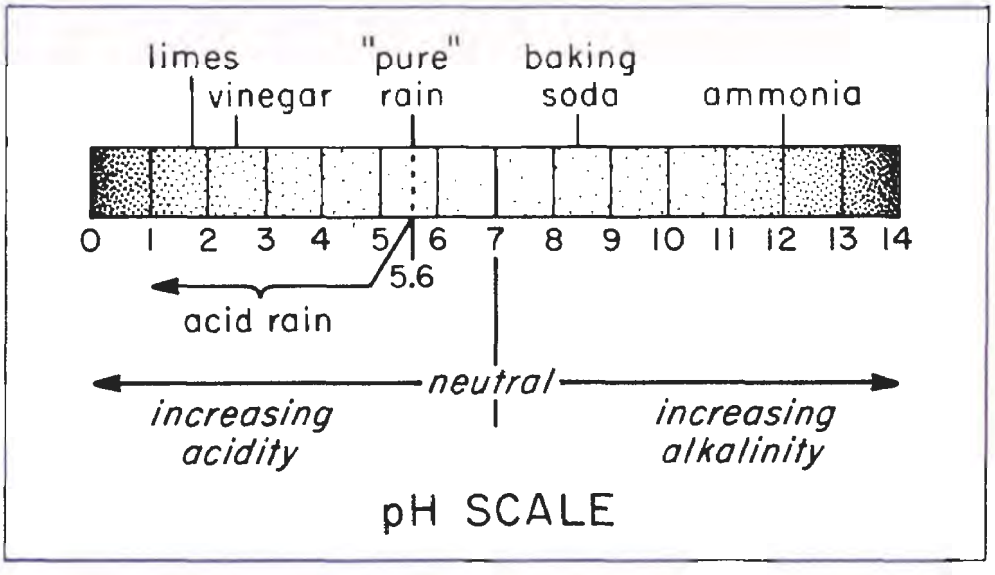
Not only soils, forests, and lakes are affected by acid precipitation, but man-made materials also are susceptible. Damage to automotive and building exterior paint and severe corrosion of marble and cement structures has been attributed to acid precipitation. Human consumption of water drawn from acidified sources may be dangerous, due to toxic metals dissolved from the pipes.

With the anticipated increased national reliance on coal-generated energy, Federal, State, and private agencies are beginning to intensify efforts to understand and cope with the complex interrelated problems of air pollution and acid precipitation.

The best estimates are that approximately $6 million dollars are being spent by the Federal Government in Fiscal 1979 on specifically designated acid precipitation research. This amount does not include the research which may be performed that can potentially be related to this subject. □

Dr. Glass is Director of the Terrestrial Systems Division at EPA's Corvallis Environmental Research Laboratory and is in charge of the Agency's program on environmental effects of acid precipitation.





Toxic Air

By Joseph Padgett

Using sensitive new techniques in air sampling and analysis, studies around the country have revealed the presence of hundreds of airborne chemicals contributed by human activities such as the organic chemical industry, mining, smelting, refining, manufacturing, combustion, and waste disposal. Assessment of these chemicals indicates that many are toxic and may present risks to public health. Of particular concern are potential carcinogens, mutagens, and teratogens, substances for which "safe" levels of exposure may not exist.

In view of the mounting numbers of suspect agents and the threat of latent effects such as cancer, additional steps must be taken to protect public health. To this end, EPA's Office of Air Quality Planning and Standards has evolved a major program to accelerate the identification and control of toxic air pollutants.

The special concern over carcinogenic air pollutants has been heightened by an increasing awareness of the importance of environmental factors in the initiation or promotion of cancer. Unfortunately, the relative significance of air pollution in causing cancer is not well known. Air pollution is only one of a number of important factors, such as smoking, diet, sunlight, and occupational exposures, which cause or contribute to the incidence of cancer. Due to the magnitude of the cancer problem in the U.S., however, even if only a small percentage is related to air pollution, many people are affected. Since cancer caused by exposures to small amounts of airborne carcinogens may not appear for as long as 10 to 40 years, efforts to control these substances must include the consideration of future effects as yet undetected.

Recently, new techniques have been developed which provide a direct indication of the toxicity of atmospheric components. These "bioassay" techniques are being used to determine toxicity of industrial emissions as well as ambient air samples. Preliminary results from such studies add to the general concern over carcinogenic and other toxic chemicals. Certain components of ambient particulate matter sampled from a number of sites around the country, for example, have been found to be mutagenic in bacterial tests.

In addition to the direct effects of toxic air pollutants, a number of indirect adverse consequences can result from atmospheric transformation and removal of air pollutants to other media such as water or solid waste. For example, a number of chlorinated organics are transformed by photochemical reactions into the poisonous gas phosgene. Other chlorine-containing organics may deplete the stratospheric ozone shield, enhancing the penetration to the Earth's surface of harmful wavelengths of ultraviolet radiation and posing an increased risk of skin cancer. Sulfuric acid, when washed out of the atmosphere by rainfall, may mobilize toxic elements in aquatic systems.

EPA's program to deal with the toxic air pollution problem includes the following elements:

Identification and Prescreening

Potential air toxics are identified by getting information from technical literature, studies by public agencies and private research groups and other reliable scientific sources. After identification, substances are prescreened to determine toxicity and potential for public exposure through ambient air emissions. Preliminary information on intentional and inadvertent production, volatility, and other properties, as well as ambient air data and previous scientific assessments is collected. Based on this prescreening, a decision is made on whether a full assessment is required.

An example of this process is the setting of priorities for 632 organic chemicals identified in an initial study begun in 1976. Information on production volume, volatility, estimated emissions, and toxicity was collected for prescreening. Highest priority was given to possible carcinogens, mutagens, and teratogens and to compounds likely to be present in the ambient air. As a result of prescreening, more than 40 of these compounds are currently under assessment. Two have been regulated or listed under the Clean Air Act as hazardous air pollutants. They are vinyl chloride and benzene. Eight are now considered potential candidates for regulation as airborne carcinogens.

Assessment

The purpose of assessment is to acquire information to support a decision for action by regulatory or other measures, and with input from other appropriate offices, to reach decisions on each chemical selected

through identification and screening. Detailed information on sources, production, emissions, ambient air levels, population exposures, transformations in the environment, health risks, and other EPA and Federal agency activities is collected and evaluated. Highest priority is given to air pollutants presenting a significant risk of cancer to large numbers of people. In the case of carcinogens, the probability of carcinogenicity and a quantitative measure of risk, where possible, is estimated by EPA's Carcinogen Assessment Group. The results of the complete assessment are used to help decide whether to examine regulatory options, collect additional information, recommend further testing, or elect not to regulate the substance.

As might be expected, a lack of necessary data puts a number of chemicals on "hold." Of particular concern is the need for monitoring capability to provide accurate estimates of population exposures. In this regard, several ongoing monitoring programs for toxic pollutants have been revitalized and new ones are being initiated. These include:

- A nationwide monitoring program to measure benzo(a)pyrene (a known human carcinogen) in 44 urban areas throughout the country. This monitoring program has been in operation for over 15 years and has been used to show trends in benzo(a)pyrene air quality levels.

- A nationwide monitoring program for 11 trace metals designed to show trends in trace metal air pollution.

- A screening study of organic vapors around selected large volume chemical plants in Louisiana, New York, and New Jersey.

- An ambient sampling program to determine perchloroethylene (a dry cleaning solvent and suspect carcinogen) concentrations in New York City, Detroit, and Houston.

- An ambient sampling program to determine mercury concentrations in Woodbridge, N.J.

- A three-year grant program for the atmospheric measurement of toxic organic chemicals, including the use of a mobile sampling laboratory.

- A three-year grant program to study atmospheric carcinogens and toxics throughout New Jersey.

Regulation

Direct regulation of toxic air pollutants is primarily through the use of the section of the Clean Air Act requiring national emission standards for hazardous air pollutants. Under this authority, emission standards have been developed for mercury, asbestos, beryllium, and vinyl chloride. Benzene has been listed as hazardous and regulations are under development.

The hazardous pollutant authority is the primary focus of the airborne carcinogen policy which is now under development within the Agency. The policy will outline the procedures which will be used by EPA in the identification of airborne carcinogens and in the determination of the appropriate levels of control. Among the issues the policy addresses are: the evaluation of carcinogenicity based on limited data or in the absence of human health data, the usefulness for regulatory purposes of techniques for the quantitative assessment of cancer risks, the consideration of factors other than health in the determination of control levels, and the importance of proper siting of new sources of regulated substances.

In addition to providing a regulatory basis for airborne carcinogens, this section of the Act will continue to be used to regulate non-carcinogenic hazardous air pollutants. In certain situations, effective control of toxic air pollution may also be obtained through performance standards developed for new stationary sources.

General Controls

While the programs just described specifically address toxic air pollutants on a case-by-case basis, a significant measure of control has also been achieved indirectly through attainment programs for the primary air quality goals established in 1971. Known as national ambient air quality standards, five pollutants or pollutant classes were originally regulated in this way (photochemical oxidants, particulate matter, sulfur oxides, carbon monoxide, and nitrogen oxides). An additional pollutant was added to this list in 1978 with the promulgation of the lead standard.

Photochemical Oxidants (Ozone)

The major control strategy for meeting the ozone air quality standard, violated in much of the Nation, is the control of volatile organic chemical emissions which participate in photochemical reactions to form ozone in the lower atmosphere. An important part of this strategy is the Congressionally-required reduction of hydrocarbons from auto emissions. Stationary sources of volatile organics are controlled under State Implementation Plans, which are designed to demonstrate progress toward meeting the standard.

Regulation of Emissions from the Synthetic Organic Chemical Industry

The Office of Air Quality Planning and Standards is developing standards for control of volatile organic emissions from the synthetic organic chemical industry. This program is based on the need to limit emissions of volatile organics to control ozone but explicitly recognizes the benefits of improved control for potentially toxic air pollutants emitted from this industry. Primary emphasis is placed on process and equipment specifications rather than on emission limitations. Because of the high growth and obsolescence rates of organic chemical manufacture, new source controls can be particularly effective in reducing overall emissions.

Particulates and Sulfur Oxides

From the 1960's to the present, a number of control measures have been instituted to reduce ambient concentrations of sources of particulate matter and sulfur dioxide. Results of emissions sampling and air monitoring indicate that these measures have reduced the ambient levels of a number of toxic air pollutants such as vanadium, manganese, and nickel. An EPA sulfur dioxide control measure (desulfurization of fuel oil) also has apparently resulted in decreased vanadium concentrations. Implementation of sulfur dioxide control strategies has also slowed the increase in national emissions of this chemical which occurred during the 1960's. The reduction in the inefficient combustion of coal in small scale uses, partially affected because of particulate and sulfur dioxide regulations, combined with automotive controls, has resulted in a significant decrease in air exposure to carcinogenic polycyclic organic matter.

Despite the gains that have been made, it would be an overstatement to conclude that current programs for the control of toxic air pollutants will, in short order, remedy the problems of toxic air pollution. There has been progress, both in the characterization of the substances which pollute the air we breathe and in control of many which have been demonstrated to adversely affect health.

To advance our understanding of the environment we need to continue to develop monitoring capabilities which aid in the identification of air pollutants and the assessment of control strategies. To properly evaluate air pollution's impact on public health and welfare we must have improved techniques for estimating health risks and the benefits of reducing them.

Finally, and most importantly, we must encourage and support initiatives by State and local air pollution agencies and by industry to control toxic air pollutants without Federal regulation. With more effective and efficient toxic air pollutant control, we should all breathe a little easier. □

Joseph Padgett is Director, Strategies and Air Standards Division, EPA's Office of Air Quality Planning and Standards.

A review of recent major EPA activities and developments in the pollution control program areas.

AGENCYWIDE

Cleanup Pact with U.S. Steel

In what the EPA calls "the biggest environmental control agreement in steel industry history," U.S. Steel, the Nation's largest producer, has agreed to bring nine of the company's western Pennsylvania plants into compliance with air and water pollution regulations between now and the end of 1982.

The agreement was reached between U.S. Steel and the EPA, the U.S. Dept. of Justice, the Commonwealth of Pennsylvania, and Allegheny County, Pa. This pact modifies a 1976 consent decree which covered U.S. Steel's coke producing facilities at its Clairton Works.

The pact covers approximately $400 million of air and water pollution control projects, including a number of control projects already under construction. The $400 million of expenditures is in addition to more than $200 million which U.S. Steel has already spent or committed to air and water quality projects in the Pittsburgh area, according to the company.

"We are very pleased to have reached this agreement," EPA Administrator Douglas Costle said. "It is good for the environment, the company, the communities and the jobs of thousands of people in western Pennsylvania."

The agreement still must be approved by the U.S. District Court for the Western District of Pennsylvania, in Pittsburgh.

Pollution Agreement Signed

EPA Administrator Douglas M. Costle recently announced that the Agency and the Crucible Steel Company have signed an agreement to bring the firm's Midland, Pa., plant into compliance with air and water pollution control regulations.

The plant, located northwest of Pittsburgh, has agreed to install pollution control equipment and to adopt interim pollution-control measures, while simultaneously changing its steel-making process from its present heavily-polluting blast furnace and coke oven operation to the use of electric arc furnaces.

The modernization and cleanup agreement, estimated to cost Crucible $50 million in capital expenses, will mean compliance by the Midland plant with all present clean air and water standards between now and 1982.

"This agreement is another significant example of our efforts to achieve pollution control and protect public health, while enhancing the economic stability of the entire steel industry," Costle said.

The project will result in an approximately 75 percent reduction in sulfur dioxide and particulate emissions from the Midland, Pa., facility.

The agreement still must be approved by the U.S. District Court for the Western District of Pennsylvania.

AIR

Final Monitoring Rules

The EPA recently issued final rules designed to improve national air quality monitoring. The actual monitoring of atmospheric air pollution is generally the responsibility of State and local air pollution control agencies.

"State and local governments, with EPA guidance, have made significant and continuing progress in pollution monitoring since the very beginnings of EPA's air program," said EPA Administrator Douglas M. Costle. "I am confident that past data has been sufficiently reliable to form the basis for sound decision-making."

"These new rules will even further reduce the potential for errors, and ensure sound data for cost-effective pollution control strategies," Costle continued. "In addition to providing high quality data at the national level, the new system will give State and local agencies more flexibility in conducting special purpose monitoring of local air pollution problems."

ENFORCEMENT

Unleaded Gas Increase

The EPA and the Department of Energy recently announced several actions they are taking to increase the production of unleaded gasoline to ensure that sufficient supplies are available for use in post-1974 automobiles. These actions are necessary to ensure that shortages of unleaded gasoline do not result in use of leaded gasoline in cars requiring unleaded, which would result in poisoning of auto emissions controls.

The actions by EPA and DOE are designed to increase the refiner's flexibility to meet market demand for unleaded gasoline by encouraging a shift of production from leaded to unleaded gasoline. They will also avoid a reduction in overall gasoline availability which would have resulted from the scheduled reduction of lead in gasoline after October 1.

Meanwhile, EPA Administrator Douglas M. Costle has suspended enforcement of the current ban on the "MMT" gasoline additive until October 1, 1979, in order to increase supplies of unleaded gas this summer, thus minimizing the problem of pollution-control catalysts on automobiles being damaged with leaded gas.

"This temporary action during the summer driving months will allow slightly more hydrocarbon emissions," Costle said. "But the alternatives could be massive fuel switching which would wipe out years of cleanup progress and millions of dollars in air pollution control equipment."

The Clean Air Act banned the use of MMT (methylcyclopentadienyl manganese tricarbonyl) as a fuel additive in September 1978. EPA refused to waive the ban as requested by the Ethyl Corporation because tests showed MMT increased the amount of hydrocarbon air pollution emitted by cars. MMT is made by the Ethyl Corporation of Ferndale, Mich.

By suspending enforcement EPA is granting a request by Tenneco, Inc. that MMT be permitted at least during the summer driving period.

Oil Dependence Cut

The EPA has recently approved a change in regulations which allows a vital New England power plant to convert from foreign oil to domestically-produced coal for its electricity generation, reducing that region's dependence on imported oil by as much as 17 percent.

The Brayton Point plant in Somerset, Mass., is the first major power plant in New England, and the largest in the Nation, to voluntarily convert from oil to coal. The coal-conversion will be phased-in from 1982-84.

"Our approval of the conversion of the Brayton Point facility to coal is an important step in helping the Nation reach its goal of energy independence, said EPA Administrator Douglas M. Costle. "EPA continues to encourage development of increasingly effective pollution controls for power plants, so as to promote use of coal and the protection of the environment."

"Based on extensive analysis, the Massachusetts Department of Environmental Quality Engineering and EPA are confident that the burning of coal at Brayton Point will not violate atmospheric air quality standards protecting public health," Costle said.

Auto Recall

The EPA recently announced that another class of 1979 Chevettes failed Federal air pollution standards during assembly line testing and told the General Motors Corporation the vehicle could not be produced unless the problem was fixed. The Agency is ordering GM to recall about 67,000 of these cars already shipped to dealers, bringing the total number of Chevettes recalled since April to 107,000.

GM informed EPA that it has made modifications to the automobile's exhaust recirculation system and distributors to meet the standards and avoid a production shutdown.

The Chevette failure was discovered while EPA was conducting an assembly line emission check. In April, EPA ordered emission control changes on models with an auto-

matic transmission and "high output" 1.6 liter engine and recalled over 40,000 cars. The May order affects Chevette models with the same transmission but with a standard 1.6 liter engine. In both cases the cars were exceeding the carbon monoxide limit.

The recent order does not affect cars produced for sale in California, because GM's California cars use a different emission control system to meet that State's stricter pollution standards.

PESTICIDES

Pesticide Approved
The EPA recently decided that the pesticide OBPA, which is used in a wide variety of plastic consumer products to protect them from fungal and bacterial damage, does not pose a threat to human health or the environment if used in accordance with label instructions.

This decision means that OBPA has been restored to its former place on EPA's list of currently registered pesticides. OBPA is an organic arsenic compound known technically as 10,10'-oxybisphenoxarsine.

In 1976 EPA placed OBPA on its list of suspect pesticides that might be hazardous to health. EPA's review of animal and other studies on OBPA, however, indicated that it is not.

Fire Ant Controls
The EPA has taken a number of steps to provide new insecticides for the battle to control destructive fire ants in the southern U.S.

EPA recently broadened the use of a veteran insecticide, "Diazinon," to allow homeowners to pour it on the ants in their earth mounds.

In addition, EPA has approved controlled field trials with two experimental insecticides to determine if they can eventually be registered as safe, effective tools for controlling the ants.

"Our goal—and the goal of State officials and other concerned persons—is pesticides or other control methods that will minimize the health and economic hardships created by the ants without causing unreasonable human or environmental damage," said EPA Deputy Administrator Barbara Blum.

At press time, EPA was reconsidering whether it should allow Mississippi to make emergency use of another insecticide, called "Ferriamicide," against the ants.

Earlier this year, EPA gave the State permission to do so, but later opened the decision to further study because of Canadian research indicating that a breakdown product may be highly toxic.

Ferriamicide contains the insecticide "Mirex," a former fire ant poison that EPA and Mississippi agreed to stop using after June 30, 1978, for fear of harm to humans and the environment.

RADIATION

Increased Cancer Risk
EPA Administrator Douglas M. Costle recently announced findings which indicate that people in some homes built on Florida phosphate lands face an increased risk of cancer from radioactive radon gas.

In a letter to Robert Graham, Governor of Florida, Costle recommended that corrective action should be taken to reduce indoor exposure to radon and that future homes should be designed to prevent excess radon accumulation. Costle cautioned that, " all of the risks we have identified are based on lifetime exposures. Thus, the situation in Florida does not represent an imminent health hazard. However, it does warrant early attention and action."

Radon gas is a by-product of radium which is naturally present throughout the United States. Radium in the soil decays forming radioactive radon gas. Higher concentrations of radium appear in phosphate lands scattered throughout the central and northern portions of Florida.

Radon can penetrate concrete slab foundations or footings, a type of construction commonly used in the Florida area, and collect inside the houses.

TOXICS

Chemical Inventory Issued
The EPA has published the country's first comprehensive inventory of chemicals produced in the U.S. or imported here.

This initial listing of chemical names, published June 1, 1979, has 43,278 compounds. They include acids, alkalies, organic chemicals, plastics, and pigments produced or imported since January 1, 1975. A total of 7,420 chemical producers and importers reported for the inventory.

The inventory, required by the Toxic Substances Control Act, is not a compilation of suspect or dangerous chemicals but simply a listing of compounds manufactured or imported during the past four years. The Agency will update this listing periodically.

The inventory has another important purpose. Thirty days after its publication, firms wanting to produce or import chemicals not listed must notify EPA of this fact in advance and submit available studies on the health and environmental effects of these new materials.

This 'premanufacture notification' provision is the backbone of a program to ensure that chemicals are screened for human health and environmental effects before they're put on the market.

Conference on Technology
The EPA is planning a conference on "Wastewater Treatment Technologies for the Control of Toxic/Hazardous Pollutants." Sponsors will be the Industrial Environmental Research Laboratory in Research Triangle Park, N.C., with the cooperation of the Municipal Environmental Research Laboratory and the Robert S. Kerr Environmental Research Laboratory. The conference is scheduled for March 26-28, 1980, at the Stouffer's Cincinnati Towers in Cincinnati, Ohio.

Those interested in participating should submit a 300-word abstract by Oct. 1, 1979, to Kenneth A. Dostal, IERL-Ci, EPA, Cincinnati, Ohio 45268. Additional information or questions can be directed to Dostal by mail or phone (513/684-4227).

WATER

Water Permit Program Revised
In a continuing effort to simplify regulatory programs, the EPA has revised its water pollution control permit program, which limits wastewater discharges from 55,000 industries and city sewage plants.

The new regulations streamline permit appeal procedures, increase the public's opportunity to participate in the permit issuing process, and promote uniformity in assessing non-compliance penalties across the country.

"The new regulations will make our water pollution control permit program a more effective tool in achieving the goals of the Clean Water Act," said EPA Administrator Douglas M. Costle.

Ocean Discharge Rules
New rules from the EPA may save money in sewage plant construction and operation for certain coastal cities and towns, provided some tough environmental conditions are met.

The rules provide an opportunity for certain municipalities which discharge their treated wastewater into marine waters to apply for a "modification" of existing requirements that "secondary treatment" be provided to their wastewater. Congress provided for such modifications in Section 301(h) of the Clean Water Act of 1977.

The new rules will not increase the number of communities that now discharge treated sewage into ocean waters. But some coastal communities have claimed that the treated wastewater from their plants is rapidly dispersed in ocean waters, making present secondary treatment requirements more stringent than necessary to protect the ocean environment; Congress then mandated this opportunity to get a modification in treatment requirements. □

Correction:
The depth measurements in meters listed for the Great Lakes in the June EPA Journal inadvertently were listed as "feet." The correct measurements in feet are Lake Superior: 1,333 feet; Lake Michigan, 923 feet; Lake Ontario, 802 feet; Lake Erie, 210 feet; and Lake Huron, 750 feet.

Impressions of China

An interview with Deputy Administrator Barbara Blum.

The United States and China recognize that one of the most productive areas to improve relations is in the area of science and technology. During the January visit of Vice Premier Deng Xiaoping, a formal science and technology agreement was signed between the two countries. The recent mission of EPA Deputy Administrator Barbara Blum to China, at the invitation of Dr. Jennie Liu of the Chinese Academy of Science's Institute of Environmental Chemistry, marked the first step toward exploring possibilities for environmental cooperation between China and the U.S. Blum was accompained by Dr. Stephen Gage, EPA Assistant Administrator for Research and Development, and Mr. William Drayton, EPA Assistant Administrator for Planning and Management.

What struck you as being China's greatest environmental problem?

The air pollution. We took a portable monitor that has recently been developed to take instant readings for fine particulates. We took readings in major Chinese cities such as Peking, Shanghai, Wuhan, and Canton. We got particulate readings from a low of 60 to a high of 650. This compares to the standard for total particulates of 75 in the United States.

Isn't it rather startling that in view of the limited number of cars and vehicles in China they still apparently have a significant problem with air pollution?

Most of it comes from industrial sources. In China, there is quite a bit of heavy industry—steel mills, petrochemical plants, and so on. They also have small manufacturing companies which have no environmental controls. In addition, they burn coal for cooking and for heat in the winter, so that adds significantly to the problem. We would be walking along a street, stop to take a reading on our monitor, and find out that when we passed a charcoal fire the monitor would jump up 150 to 200 micrograms.

Do the Chinese seem concerned about their pollution problem?

They're very aware of the problem—and seem eager to do something about it within the limit of their financial resources. But they have a population close to one billion people, so their primary concern, understandably, is food.

The Chinese environmental community, of course, has pollution control as its dominant interest. Generally, however, capital investment by the Chinese is going mostly into plant expansion. There will be some pollution control—but it appears that at the present time it may be minimal. I must add that the Chinese are further advanced in curbing water pollution than air pollution. They're concerned about keeping fish alive, but the concern about people, for example, eating fish caught near an electroplating plant seems to be of less immediate importance. They realize a health hazard may exist, but their priorities are different from ours. Again, their primary focus is on feeding people. Once that problem is resolved, then it seems they'll devote more and more attention to the quality of the food people eat, the air they breathe, and so on. It's more a matter of first things first.

Didn't the limited number of cars in the cities help curb air pollution well below levels in New York or Chicago?

I'm certain it does. All Chinese automobiles, including taxi cabs, are owned by the government. It seems like you see only one car for every 2,000 or more people on foot or bicycles.

Did you meet with any of China's top leadership?

On our second day in Peking, Bill, Steve and I were having lunch with Ambassador and Mrs. Woodcock in the U.S. Embassy when a call came inviting us to meet with Fang Yi, Vice Premier and Chairman of the PRC Scientific and Technological Commission. The Vice Premier asked, quite unexpectedly, to see the three of us in the Great Hall of the People. We met shortly thereafter, talking at some length about pollution problems China faces. He is very concerned. He indicated interest in developing a U.S.-China bilaterial environmental agreement, saying he believes that pollution is one of the major problems confronting rapidly industrializing countries such as China. He also indicated willingness to direct a substantial portion of the country's capital investment into pollution control equipment.

Does China have any national standards for air pollution or water pollution that you are aware of at this time?

This is a very difficult question to answer. The standards they have appear to be province-by-province and municipality-by-municipality. For instance, in Shanghai the Chinese talked about tall stacks to control air pollution. In another city, officials said they did not believe in tall stacks, questioning whether they do any good. Obviously, there is considerable local autonomy in attacking these problems. Work toward national environmental protection laws is underway, although it was explained that the laws were in draft form and not ready to be discussed in any detail.

Do they have any organization comparable to EPA on a national level?

They have the Environmental Protection Office, which reports to the State Council. This organization has about 60 people in Peking at the present time, supplemented by, depending on the size of the region, from 6 to 30 people in each of the provinces. In addition, most municipalities also have environmental protection offices. Each major factory also has an environmental protection officer, who reports to the factory manager.

Does China have the equivalent of environmental impact statements?

No. They were very interested in our National Environmental Policy Act, asking many, many questions about it. But at present, this isn't their approach. The Chinese, however, are preparing to do a major hydrobiological impact study prior to moving the Yangtze river a thousand kilometers north for irrigation and transportation purposes. The project—something they said Chairman Mao wanted before his death—is a major undertaking. The hydrobiologists are extremely worried about the possible changes in salinity of the water if the river is moved. They also have some very realistic concerns about

Bikers in Peking.

the impact of the venture on the entire ecosystem. The Chinese, in fact, have set up a special commission on the movement of the Yangtze, due, I'm certain, to the magnitude of the project and the many issues involved.

What methods do the Chinese government officials use to enforce anti-pollution measures? Did you find evidence that there are any enforcement efforts at all?

They talked a lot about closing plants, and said that they have the ability to do so. But my impression is that they do it in a very limited way. They do use a system of incentives which allows a plant, for example, to retain some money from the sale of recycled materials instead of turning it over to the commission that governs that particular industry. I was also told that in certain instances names of polluting companies are published in newspapers and that salaries of plant managers can be cut if measures to reduce pollution are not taken.

Would you say that China is a relatively clean country? What was your overall impression?

China is a very neat country. There is no litter on the streets. Because labor is plentiful, people frequently clean the streets. The Chinese have made quite a few gains in controlling water pollution. However, particularly in many industrialized areas, the level of air pollution is high.

How about disposable bottles? Did you see any of those over there?

I didn't see anything disposable, except for paper napkins and small cardboard boxes.

Did the Chinese indicate in what areas they would cooperate with the United States and the EPA?

Yes. They are interested in several different areas, and we will be taking those under consideration in the weeks to come. One area in which the Chinese are ahead of us is the area of biological pest control—integrated pest management. They're doing some very impressive work. They raise predator insects and have an extremely sophisticated system that we'd like to study closely. EPA has a contract on integrated pest management now with the University of Arkansas, and one of the first things we'll ask them to do is to examine the work the Chinese are doing. The Chinese, on the other hand, are primarily interested in cooperating with us on the health impacts of air and water pollutants, identification of toxic substances, the methodology of environmental assessment, and monitoring techniques.

Did you get the impression that some of their high-ranking officials might like to make a return visit to this country?

I invited the Director and the Deputy Director of the Environmental Protection Office to visit the United States. They were very positive about the invitation, although I can't say how soon such a trip could be scheduled.

I was wondering if you saw any examples of research efforts other than the biological controls you mentioned earlier?

Yes. We saw some very advanced equipment—equipment that's as good as any we have in our labs in the U.S. Interestingly, the portable particulate monitor we took to China is the first of its kind in our country, yet we found a young man at the Chinese Institute of Chemistry who, based upon reading a journal article by the U.S. manufacturer, developed his own version. It looked rather crude, but seemed to work as well as the U.S. product.

In what ways would you say that the mission over there was most worthwhile and useful to the Agency?

Clearly, in the area of biological pest control, they can be of great help to the U.S. I'm hoping that we can be helpful too, since we all have a stake in protecting the global environment. Anything that helps them will help us and vice versa. I believe, too, that there is tremendous value in getting acquainted with environmental leaders in China. This lays the groundwork for other important areas of cooperation that are certain to develop over time.

Do you have any other impressions?

Generally, the Chinese aren't able to educate people as quickly as they would like because they lack sufficient university facilities. For instance, last year there were between 250,000 and 300,000 students entering college in a country with a population of nearly one billion. Then, too, there is as much a problem if not more with occupational health and safety as there is with environmental matters. So more and more people are going to have to be educated, and priorities must be set. None of it can be accomplished overnight.

We met two people in their fifties who teach at a university of engineering. They were going back to graduate school, one at Oxford and one at the University of California at Berkeley. It struck me as unusual that they were sending older teachers back to school to obtain still more training, considering the enormous investment involved and the time left before they retire. We were told that there was no one younger with suitable educational background who could take advantage of Oxford and Berkeley.

I assume that there was a substantial number of people using bicycles in the Chinese cities?

Yes. The streets were filled with hundreds of bicycles, hundreds of pedestrians and very few cars.

How does that system seem to work?

Fine. The Chinese also seem to have a rather sophisticated rapid transit system—buses and electric trolley cars. People who ride bicycles seem to live fairly close to work. The streets are crowded with bicycles. They even have parking lots for bicycles instead of automobiles. I must say it's much nicer—in part, because parking facilities don't take up so much room. Homes and corridors of office buildings are often filled with bikes.

I suspect the Chinese may have a lower incidence of heart disease than in the U.S. because of all the exercise. And, of course, there are no gasoline lines. □

A SUMMER POND

By the end of July, the frog chorus at a country pond in rural Virginia has subsided to only an occasional call breaking the hush of long summer evenings.

The green frog, sometimes called "the pond banjo player," still occasionally shatters the calm with a mating summons sounding as if someone had just strummed a guitar.

The tiny cricket frogs challenge each other with their rattling tunes resembling Spanish castanet players trying to outdo each other.

An occasional gutteral "jug-o-rum" call announces that the bullfrog is still in residence.

But these sounds have little of the passionate intensity that marked the early mating season, and no tunes are heard from the "peeper" frogs whose deafening chorus welcomes in each new spring.

Meanwhile, swallows swoop over the water lily-bedecked pond in pursuit of insects. Occasionally the wings of these swift fliers graze the water and dimple the surface.

As dusk deepens, fireflies begin to light up in the towering trees surrounding the pond. A fox barks from a nearby hill and a whippoorwill begins its haunting and insistent song.

A water snake weaves its sensuous way silently across the water hunting for a frog or other suitable meal. An owl perched in a nearby white oak watches intently ready to make its attack on the snake.

Although the pond appears peaceful, most of its inhabitants must hunt and be hunted. The sometimes savage struggle to survive continues in this as in other habitats. Even the goldenrod and asters vie with each other for a place in the sun.

In the distance the rumble of thunder sounds and a rainstorm can be heard advancing through the forest. Soon a downpour is sweeping the pond, providing badly needed water for the autumn drought period when the flow from the springs feeding the pond begins to slacken.

The wet season of late fall will help replenish the pond but meanwhile all sources of water are needed.

During the life cycle of a pond the main threats to its inhabitants are drought and pollution.

In the absence of these hazards the pond is a relatively independent entity in which life can go on with little contact with the outside world.

The sumac and Virginia creeper at the pond edges are already beginning to show a few crimson leaves, a harbinger of autumn. With the arrival of fall the pond will turn quiet. The frogs will hibernate after burying themselves in the mud. When the last of the asters and goldenrod are gone, the bees will quit coming, their season's work completed.

By November there will be patches of ice on the pond. The cold will deepen. Harsh winds will rattle the leaves on the big-toothed aspen. Then snow will mantle the ice cover.

The whispering pines keep alive the hope of another green time in the endless cycle of the seasons. If the pond has been protected from the blight of pollution, when spring returns the peepers will stir from their muddy slumbers and their sweet singing will once again be heard over the land.

—C.D.P.

A Legacy of Poisons

Continued from page 4

rally in food, especially seafood. A component of various ores, arsenic is rarely found as a free element in the environment. Arsenic is used in many industries. It was an important component of the first commonly used pesticide, Paris green. Acute arsenic poisoning affects the heart, kidneys, stomach, and intestines.

Benzene—This building block of the modern plastics industry was discovered in London household lighting systems that used gas made from decomposing whale oil. In 1825 Michael Faraday isolated the substance from the oily deposits left by the whale oil gas. Before World War II it was called benzol, and was obtained largely from coal. Most of the benzene produced in the U.S. today comes from petroleum. It is a starting material for many plastic products, nylon components, and synthetic detergents. The liquid is flammable, and acute exposure to it can cause headaches, diarrhea, and burning in the eyes, nose, and mouth.

Beryllium—Some call this substance an atomic age poison. Its main uses are in the nuclear energy industry, as solid fuel for rockets, and in heat shields for spacecraft. Beryllium is alloyed with other metals for strength and hardness. It was discovered in 1798 by a French chemist and successfully isolated in 1828. Overexposure to beryllium can cause pulmonary disease.

Cadmium—A heavy metal of increasing usefulness in the industrial world, this substance is rare in Nature. Cadmium occurs in infinitesimal quantities, less than one part per million throughout the Earth's crust, but is produced as a byproduct of zinc extraction and is found in some lead ores. The substance was discovered in 1817. It is used in alloys with low melting points and as a protective plating on other metal. It is also used in nuclear reactors and as a component in insecticides. The main source of cadmium exposure to the general population is from foods. It also reaches people through tobacco in cigarettes, a factor which may double the body burden of cadmium received by other routes. The National Academy of Sciences reports that a study of toxicants found levels of 0.013 milligrams of cadmium in the lunches of sixth-grade children in 300 U.S. schools. In Japan cases of cadmium poisoning have led to what is called "itai-itai", literally "ouch-ouch" disease, because of the pain inflicted. Cadmium affects the kidneys and lungs.

Lead—This heavy metal has been used in industry for so long that some scientists believe baseline data for naturally-occurring levels can't be obtained. All compounds of lead are poisonous. The Egyptians and Babylonians used lead. Nicander, the Greek poet, said this about lead poisoning, "The mouth it inflames and makes cold from within, The gums dry and wrinkled are parch'd like the skin, The rough tongue feels harsher, the neck muscles grip, He soon cannot swallow, foam runs from his lip . . ." The Romans used lead water pipes as well as cups and plates. Some researchers blame the fall of Rome on bizarre behavior they attribute to lead poisoning. More recently brain damage and learning disabilities in inner-city children have been attributed to high lead levels. In the past, lead intake came mainly from waterpipes, insecticides, food containers, and lead-based paints that flaked into the air. Scientists now say that contamination from these sources has been reduced and that new problem sources are cigarettes, cosmetics, and auto exhausts from burning leaded gasoline. Air pollution can leave deposits on vegetation but according to the National Academy of Sciences little of what is absorbed in food is retained by humans. Inhalation of air and dust and absorption by or through the skin may be more significant routes of contamination. One symptom of chronic lead poisoning is a bluish line on the gums above the teeth. Overdoses cause anemia, brain and nerve disorders, and paralysis of the extremities.

Mercury—Sometimes called quicksilver, mercury has no known essential function in living organisms and is not found free in Nature. It has been used for centuries, however, by the Chinese and Hindus, and was found in Egyptian tombs dating to 1500 B.C. Mercury is extracted from cinnabar. Its name comes from 'mercurius.' Mercury is used in barometers, thermometers, control instruments, and in the manufacture of batteries and fungicides. In the past mercury sometimes entered the food chain through seeds that were treated to prevent fungus growth. National Academy of Sciences' reports note that small amounts have been found in fruits, vegetables, dairy products, cereals, and meats. Higher levels occur in fish. Ingestion of contaminated fish caused a well-known incident of mercury poisoning at Minamata, Japan. In 1953 cats in that fishing village began to act strangely. They staggered, went mad, and died. Later in the year people living in the village showed similar symptoms and over the next eight years some 43 people died and 68 were disabled by mercury poisoning. The mercury came from industrial effluents that poured into the bay and contaminated the fish. Scientists sampling mud from the bay found that it held 2,100 parts per million of inorganic mercury. Acute poisoning from mercury causes diarrhea, depression, and tremors. It was once common among goldsmiths, mirror-makers, and hatters. The expression "mad as a hatter" is thought to come from the effects of breathing fumes from the mercury used to cure furs.

Since the Industrial Revolution an increasing number of poisons are used in, produced by, or left over from the daily business of modern life. The substances permeate the air, land, and water and can be unknowingly absorbed by persons entirely unaware of their existence.

A miniscule amount of any given substance in drinking water, for example, may seem like a petty concern. Who drinks that much water? But suppose the contaminant also adheres to cooking and eating utensils, is breathed in household dust, finds its way into food, collects on the skin day after day, is stored in body tissues, and is not excreted from the body? In this manner unsuspecting people can accumulate surprising amounts of unwanted substances.

If the people involved also work at jobs where they are exposed to dangerous chemicals or live in an area where other risks exist from air and water pollution, the synergistic effects of several substances may have harmful effects.

Physicians who specialize in the study of poisons note that many factors affect the impact of a given amount of poison on people. Age, heat, genetic factors and personal habits like consumption of alcohol, smoking, and eating habits can affect a person's vulnerability to poisons. The dangers of many poisons to smokers are much greater than to non-smokers. A poison can have a greater effect on someone who has an empty stomach than one who has just eaten. Alcohol can concentrate the toxic effects of various solvents. Some inherited conditions alter greatly a person's response to chemicals. Persons with different genetic factors respond differently to their environment: some persons may be adequately medicated by a given dose of a drug; others may fail to respond to the agent because of too rapid metabolism or removal from the body; still others become toxic because of build-up of the chemical within the body. As for age influencing response to chemicals, numerous examples exist where the very young or very old respond differently from those of intermediate age.

As we ponder the problems posed by toxics and our choices for future action, we might keep in mind a quote from *Alice in Wonderland:* "She had never forgotten that, if you drink much from a bottle marked "poison," it is almost certain to disagree with you, sooner or later." □

Chris Perham is an Assistant Editor of EPA Journal.

REGION 1

Asbestos Regulations Violated

EPA has issued enforcement orders to three companies involved in the demolition of the Fitzgerald Gasket Company building in Torrington, Conn., because of violations of regulations governing the handling of asbestos.

The companies cited are H&S Torrington Associates of Needham, Mass., owner of the building and site; Healy Corporation also of Needham, the general contractor; and Manafort Brothers, Inc. of Plainville, Conn., the demolition subcontractor. EPA regulations require that asbestos-containing materials such as pipe and duct insulation be kept wet during renovation projects, be stored and transported in air-tight containers, and ultimately be disposed of at approved asbestos waste disposal sites.

The orders require the three companies to submit written notices to EPA prior to beginning any future renovation or demolition projects involving asbestos, and specifically require each company to comply with the EPA asbestos handling procedures. A violation would subject the companies and their officers to civil or criminal penalties of up to $25,000 per day or one year in prison.

REGION 2

PCB Fines Issued

Region 2 recently collected a total of $61,000 in civil penalties from six companies for violations of regulations governing the storage, disposal, and marking of polychlorinated biphenyls (PCB's).

In two earlier settlements, a General Electric facility in Waterford, N.Y., paid $25,000 in penalties for burning PCB's four days without authorization. SCA Chemical Waste Services, Inc., in the Town of Porter, also in New York, paid $15,000 for improperly storing PCB wastes in an unauthorized area on their property.

Region 2 has initiated a second action against General Electric facilities in New York State for violations of PCB regulations and in an eight count complaint is proposing a total penalty of $31,900. Two EPA inspections of the company's Ft. Edwards and Hudson Falls facilities in late January revealed allegedly improper storage of PCB's. At press time, no settlement had been reached.

Four other companies have recently agreed to pay penalties for violations of the PCB rules. They are: New Jersey's Public Service Electric and Gas; the International Dismantling and Machinery Company of Edison, N.J.; the Newco Chemical Waste Systems, Inc., of Niagara Falls, N.Y.; and the Atlantic Electric Company in Atlantic City, N.J.

No evidence of harm to human health or the environment was found in any of the violations. However, EPA requires strict compliance with the rules governing the handling of PCB's because of the high environmental risks associated with their improper use.

REGION 3

Pollution Cleanup Agreement

Region 3 and the City of Philadelphia recently signed an agreement ending over three years of intense negotiations and law suits concerning operation of the city's sewage treatment plants and the dumping of sludge into the Atlantic Ocean.

The agreement was also signed by the States of Pennsylvania and Maryland, the Delaware River Basin Commission, and the Sierra Club.

Philadelphia agreed to spend over $692 million to upgrade its three sewage treatment plants over the next four years, thereby reducing the level of pollution discharged into the Delaware River. The city also reaffirmed its commitment to stop the ocean dumping of sludge by December 31, 1980.

EPA will provide the city more than $519 million of the project's cost in Federal grant funds, administered through the State of Pennsylvania. This will reduce the city's share of the costs to 25 percent or $173 million. It is anticipated that the construction and related activities resulting from this agreement will provide over 18,000 new jobs in the Philadelphia area.

The major provisions of the agreement include the upgrading of the three city-operated sewage treatment plants; the agreement by the city to stop all ocean dumping of sludge by December 31, 1980; and the establishment of "The Philadelphia Environmental Trust Fund" with an initial deposit of $2,165,000. The fund will be used by the city to undertake environmentally beneficial projects not currently required by law.

REGION 4

PCB Disposal Site

EPA Administrator Douglas Costle has denied North Carolina's petition requesting that EPA modify its regulations to permit alternative methods of disposal of PCB-contaminated soil and debris. The State had proposed an in-place activated charcoal treatment for some 200 miles of roadsides where PCB's were dumped last August. Costle told Governor James Hunt that EPA was concerned about the State's ability to ensure the integrity of road shoulders. PCB's, he said, will be released into the environtment via projects to widen roadways, construction of new driveways, routine maintenance of roads, and possible natural erosion of shoulders.

At the same time, Regional Administrator John White announced the approval of a PCB disposal site in Warren County, near Afton, N.C. The site may be developed by the State to dispose of the PCB-contaminated soil from the road shoulders. The approval given by White was for the conceptual design only. Final plans and specifications also must be approved by EPA before construction begins.

REGION 5

Sulfur Standards Proposed

EPA recently proposed to change the permissible emission standards for sulfur dioxide at two Cleveland area coal-burning plants, based on new air quality data submitted by the Cleveland Electric Illuminating Co. The new revision would permit the company's two lakefront plants, located at East Lake and Avon Lake, to continue burning local high-sulfur coal. It would also help protect an estimated 70 percent of coal mining jobs and 63 percent of Ohio's coal production.

In its petition to EPA, the company contended that sulfur dioxide standards developed by using EPA's urban modeling techniques are too stringent, given the lakefront location of the two power plants. The proposed revision states that the utility must expand its air pollution monitoring system to assure that standards are not violated. Special factors in this case limit the impact of the proposed revision to the two plants and do not suggest widespread revisions of Ohio sulfur dioxide standards, said Regional Administrator John McGuire.

REGION 6

Vertac Cleanup Begins

Arkansas Governor Bill Clinton and Region 6 have agreed on a two-phase plan to contain and clean up leaking dioxin at the Jacksonville, Ark. plant of Vertac, Inc. The company has started implementation of some aspects of the plan. The company will eliminate all surface water discharges from the facility and secure all materials stored there to prevent further contamination. In the second phase, the company will store or dispose all significantly contaminated materials on the site to protect the public and the environment.

The plan also includes steps to protect workers at the plant while the cleanup proceeds. The plant was used to produce the herbicide 2,4,5-T.

Contaminated Road Oil Removed

Browning-Ferris Industries has removed and disposed in a landfill contaminated soil from roadways in Reilly's Village subdivision near Corrigan, Tex.

The company was ordered to remove the road surface by the Texas Department of Water Resources after EPA tests showed oil from Browning-Ferris, used for dust control, contained high levels of the toxic chemical nitrobenzene.

The company was also ordered to remove soil from roads in four other subdivisions similarly treated.

REGION 7

World Environment Day

To celebrate the anniversary of World Environment Day in Kansas City elementary school children from the Kansas City School District created posters on the theme, "What Will the World Be Like When I Grow Up." Teachers also received education packages in connection with World Environment Day.

Region 7 received approximately 350 posters ranging from pleas to clean up the world before it blows up to designs for cities of the future. Forty-five posters were displayed at City Center Square in downtown Kansas City to give the adult community an opportunity to view how children see the future and how they feel pollution will affect their world tomorrow.

People also celebrated World Environment Day along the Missouri River. Canoes, rubber rafts and houseboats floated the 17 miles between Hermann and New Haven, Mo. The trip was organized by environmentalists and featured short talks on the river, wildlife, and history of the region.

REGION 8

Air Plan Revised

Region 8 recently forwarded for the Administrator's signature a Federal Register action which would approve recent revisions to the Wyoming State Air Quality Implementation Plan.

These revisions were developed by the State to comply with the requirements of the Clean Air Act for nonattainment areas.

Although every State must comply with the nonattainment requirements, the Wyoming action is among the first to be sent to the Administrator.

Indian Interns

Since February, 1979, Region 8 has been participating in a Federal internship program sponsored by the American Indian Law Center, Inc., of Albuquerque, N. Mex. Through funding by the Department of Labor, the Law Center brings together interested Indian individuals for possible permanent job placement within tribal governments.

Participants attend a six-week academic program at the University of New Mexico School of Law. This serves as the core around which their para-legal experiences are built. Participants then undertake internships at the tribal and Federal levels for six weeks and four weeks respectively.

While at Region 8 interns have spent time working within the various divisions, have made field trips to inspect wastewater facilities, and have reviewed EIS documents and the Northern Cheyenne Redesignation Analysis. The Indian interns have included: Sandy Grey Owl (Crow Creek Sioux), Manuel F. Pino (Acama Pueblo), Charles Poor Thunder (Standing Rock Sioux), Buck Bettleyoun (Oglala Sioux), and Robert Tahe (Hopi).

EPA program staff report that the internship experience has been mutually beneficial in allowing EPA personnel to gain better insight into the environmental and social issues affecting Indian reservations.

REGION 9

Hazardous Waste Dumps Assessed

Region 9 has taken steps to assess the extent to which hazardous waste dumps pose an imminent health hazard. Four sites, some active, some abandoned, have been investigated by EPA and the States, and will receive priority attention by EPA and Congress. Action was initiated shortly after Deputy Administrator Barbara Blum and Michael Egan, Associate Attorney for the Department of Justice, announced in April that efforts to control hazardous waste would be stepped up. EPA technical and enforcement staff were charged with developing a work plan, scheduling case development, and working very closely with State agencies.

Potentially hazardous active and inactive chemical dumps in Region 9 are located in Phoenix, Ariz., Riverside and Lathrop, Calif., and Saipan in the Northern Mariana Islands.

REGION 10

Control Settlement Reached

Region 10 has reached a settlement with the Bunker Hill Company of Kellogg, Idaho, in their prolonged dispute over the control of sulfur dioxide from the company's lead and zinc smelter operations in Kellogg. The company has agreed to capture slightly more than 84 percent of the approximately 207,000 tons of sulfur dioxide gases produced by the smelter complex each year. Since the State of Idaho requires 96 percent control of sulfur dioxide emissions to meet ambient air quality standards, Bunker Hill may achieve the remaining 12 percent control by dispersion techniques in periods of favorable weather conditions.

The agreement settles a suit brought in 1975 by Bunker Hill in the U.S. Ninth Circuit Court of Appeals. At the time the suit was filed, EPA regulations required 82 percent capture, while Bunker Hill insisted that 68 percent capture was reasonable. Terms of the agreement are to be embodied in a Nonferrous Smelter Order.

Late Compliance Fine Paid

The Boise Cascade Corporation paid $66,000 to the U.S. Treasury because it was 11 months late in meeting the July, 1977, deadline for complying with required wastewater effluent limitations at its Steilacoom, Wash., pulp mill. The settlement brought to an end litigation by the U.S. Department of Justice against Boise Cascade. □

Marvin B. Durning

He has resigned as EPA Assistant Administrator for Enforcement, effective September 1. Durning came to the Agency in October, 1977, from a Seattle, Wash., law firm which specializes in business, corporate and environmental law. He has also served with other law firms in Seattle, and in Washington, D.C. In 1965 Durning was named "National Conservationist of the Year" by the National Wildlife Federation. He graduated from Dartmouth College in 1949, received his Masters degree at Oxford University in 1952 as a Rhodes Scholar and his law degree at Yale Law School in 1959. Administrator Douglas M. Costle and Deputy Administrator Barbara Blum said, "His personal involvement in seeking compliance with environmental laws by the steel and utility industries has produced clean-up agreements that will stand as a hallmark of this Nation's commitment to environmental protection."

J. F. Greene

She has been selected as one of the Agency's Administrative Law Judges. In this position she will hear evidence on environmental matters and make recommendations to the Administrator. Judge Greene comes to EPA from the Department of Labor, where she had been an Administrative Law Judge since 1975, hearing and deciding cases arising under a wide variety of statutes administered by the Department, including those relating to workmen's compensation and fair labor standards. She served in the same capacity with the Social Security Administration in Roanoke, Va. From 1970 to 1975 she was a trial attorney with the Federal Trade Commission, where she earlier served as an assistant to Commissioner Mary Gardiner Jones and worked as an attorney from 1963 to 1969. Judge Greene received her bachelor's degree in 1959 from Ohio Wesleyan University. She did postgraduate work at American University and earned her law degree from the University of Chicago in 1962.

John Rhett

He has been nominated by President Carter to become the senior Federal official overseeing the construction of the new Alaska natural gas pipeline. Rhett has been EPA's Deputy Assistant Administrator for Water Programs since 1973. He ran the Agency's sewage plant construction program, the largest public works and environmental quality program in the country. In his new position Rhett will supervise the enforcement of all permits and other authorizations issued by any Federal agency relating to construction of the 4,748-mile gas pipeline, which is scheduled to be completed in 1984. In addition to his other duties, Rhett will coordinate activities with the Canadian government. "Jack Rhett has been one of our most vital assets, and I wish him well in his challenging new assignment," said Administrator Costle. "His excellent work here at EPA, as well as his extensive previous experience, makes him eminently qualified to tackle the big job ahead."

Dr. Thomas A. Murphy

He has been named Director of EPA's Corvallis Environmental Research Laboratory. Dr. Murphy has most recently served as Deputy Assistant Administrator for Air, Land, and Water Use in the Office of Research and Development, a position he has held since 1975. He has been with EPA and its predecessor agencies since he joined the Federal Water Pollution Control Agency in 1967 as a biologist. In 1969 he was made Chief of Oil and Hazardous Materials Research. He became Special Assistant to the Assistant Commissioner for Research and Development in 1971, and then headed EPA's Program Development Branch in what was then the Office of Research and Monitoring. From 1973 to 1975 he served as Director, Nonpoint Pollution Control Division in the Office of Research and Development. Dr. Murphy received his bachelor's degree in 1959 from Knox College and his master's and doctorate degrees in 1964 from Yale University. In announcing the appointment, Dr. Stephen J. Gage, Assistant Administrator for R & D, said, "He has been exceptionally effective in making his research program responsive to the needs of the Agency and environmental improvement while maintaining a high quality of research."

Helping in the campaign against air pollution and traffic problems in Cincinnati are these EPA employees riding a special Metro bus, the Mt. Washington-Clifton Express, which runs between the Environmental Research Center and other locations in the city. EPA employees Donald Oberacker and Mary Lee Burbage developed the project, and Ernest Minor, Public Affairs, and Kathy Schneider, University of Cincinnati, helped them present it to the City Council for approval.

New Enforcement Plan Set Up

EPA has designated the clean-up of hazardous waste dumpsites threatening public health as the "highest Agency priority" and established an agency-wide Hazardous Waste Enforcement and Emergency Response System to respond to hazardous waste emergencies. Deputy Administrator Barbara Blum said, "we are now aware of 151 sites across the country which may contain potentially dangerous quantities of hazardous wastes. We will continue to evaluate the extent of the hazards at these sites and force responsible parties to alleviate any immediate threat to the public."

New Drinking Water Decision

In the first decision of its kind anywhere in the country, a Federal court has ordered a drinking water supplier in Oregon to correct water quality conditions. These problems were blamed for an outbreak of gastrointestinal disorders among more than 170 persons last summer in the small coastal town of Neskowin, Oregon. The order in the U.S. District Court in Portland was the first application of provisions of the Safe Drinking Water Act of 1974 that allows the Environmental Protection Agency to go to court to correct situations where drinking water standards or other requirements of the law are being violated. The case against this privately-owned water system rested on EPA's allegations of numerous violations of the Safe Drinking Water Act and a continuing serious threat to human health.

Vehicle Inspection Saves Gasoline

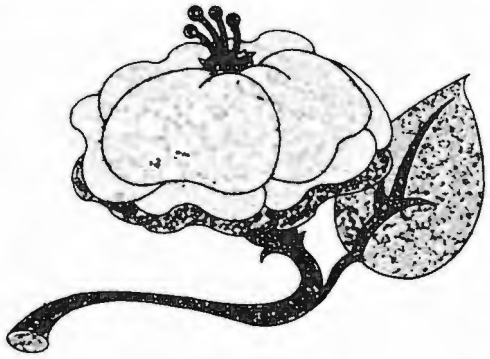
The effectiveness of vehicle inspection and maintenance in reducing two major urban air pollutants--hydrocarbons and carbon monoxide--has been substantiated in an EPA study conducted in Portland, Oregon. Results from other studies also show that such periodic checks on cars on the road can result in a 3-4 percent increase in fuel economy. "Inspection and maintenance is critical to success in cleaning up America's air," Deputy Administrator Barbara Blum said. "In the Oregon program, which I studied firsthand in a special trip to Portland, average hydrocarbon and carbon monoxide exhaust emissions were reduced as much as 47 and 54 percent respectively in vehicles which, after failing inspection tests, underwent remedial repairs."

Resource Recovery

A two-day seminar will be held in the Palmer House in Chicago Sept. 11-12 on resource recovery programs. These programs convert trash and garbage into energy and recover valuable materials such as metals, glass, and paper.

Regulating Toxics

Continued from page 2



purely geographic kind. Today, however, commercial airline schedules and supersonic speeds make Washington nearly as accessible to manufacturers from Frankfurt, Geneva, or Rome as it is to manufacturers from Los Angeles. Tokyo and Canberra, we admit, are a bit farther from our headquarters, but the critical element in our dealings with all manufacturers will be effective implementation of the law—not distance, or nationality.

Our commitment to working with nations in developing rules we can all support is further demonstrated by the time and resources EPA has invested—and continues to invest—in the OECD and other international organizations. If we do not have a genuine interest in international cooperation on toxic substances control, these activities would be a farce, and as a Nation with many ingenious people, we could figure out far less expensive ways to conduct a farce. Our willingness to cooperate has even extended to sharing drafts of our proposed regulations with other countries—something others generally have not done with us, I might add.

In sum, we share with other nations a deep interest in developing consistency in the regulation of toxic chemicals. It simply does not serve the interests of the United States to maintain one set of rules for its own manufacturers, and another set for importers. Nor does it serve our interests to erect artificial trade-barriers.

However, though we are interested in pursuing consistency, that is not the primary objective of TSCA. Its goal is to protect our citizens and environment from unreasonable chemical risks.

If our proposals appear rigorous and too demanding, it stems not from a desire to interfere with international trade; nor from some misplaced sense of American self-righteousness. It stems, rather, from an unusually painful American experience with the damaging—and, on occasion, disastrous—effect on health and our economy of weak or non-existent toxic regulation.

At present, one State is struggling with the clean-up of a site from which toxic chemicals—stored in the ground for more than 20 years—have suddenly erupted. Well over 200 families have had to be evacuated, and their homes purchased by the State. Such remedial measures are too late to help children suffering from birth defects. The projected expense so far is over $23 million, from a site that would have cost us about $2 million to control years ago.

Another State has had to close a major river to fishing because of chemical contamination from a carelessly managed factory. A number of workers from that factory have suffered severe nerve damage from exposure to the chemicals; perhaps they can be cured, perhaps not.

Another State is trying to figure out how to dispose of thousands of drums of potentially hazardous chemicals improperly stored by a private businessman. Health effects of these leaking drums are not yet clear, but the financial effects are: government will have to pay for containing that site, because the businessman died last year.

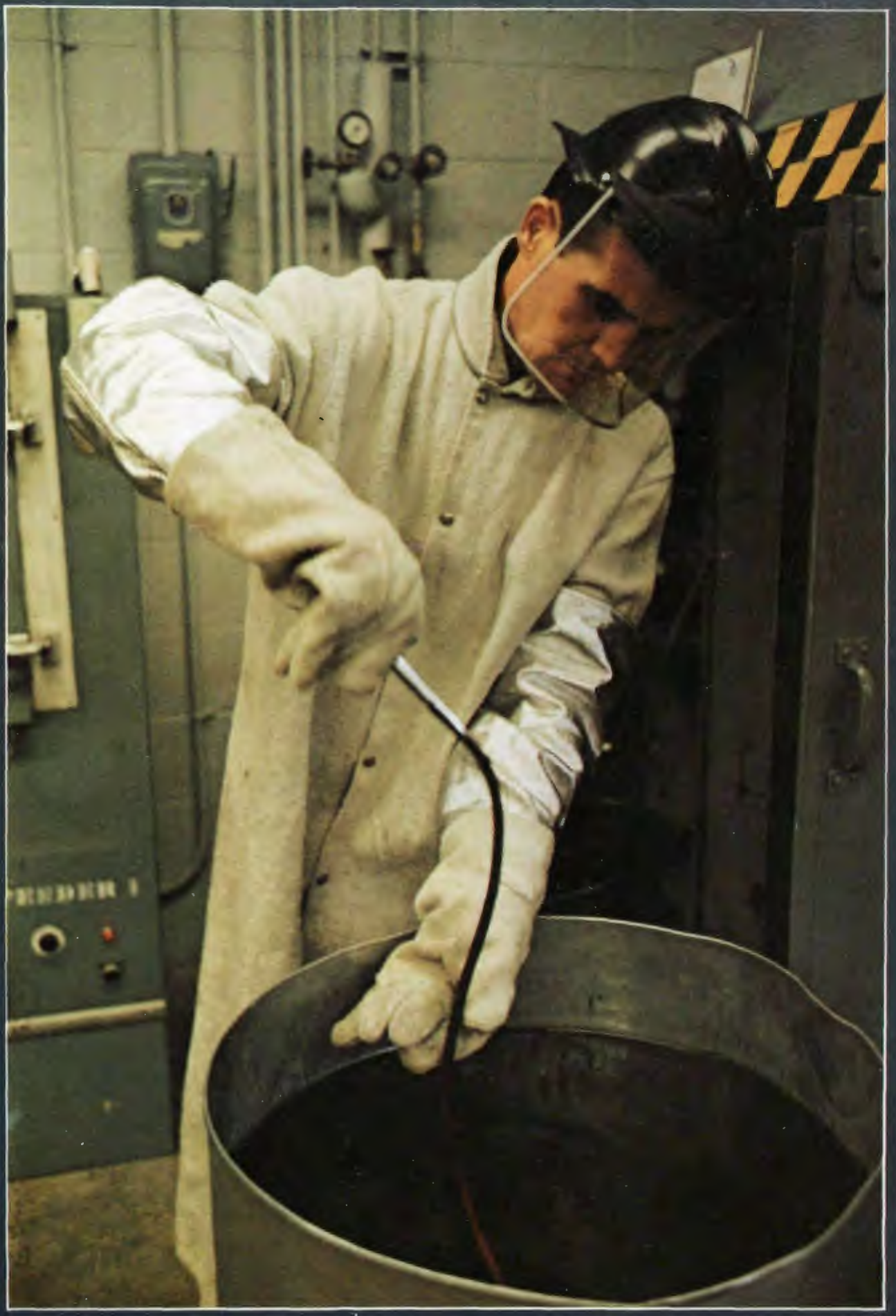
In one location after another, we are discovering—in a sudden rash of incidents—case after case in which the chemical revolution that has so benefited Americans is now imposing some surprising, and too often tragic, costs upon us.

From these experiences, we have derived an ugly but worthwhile lesson: if one must make a mistake in protecting public health, either through an excess of caution or an excess of risk, one should make that mistake in the direction of caution. Both courses entail costs, but we prefer the price of caution.

We are doing our level best to make TSCA a prudent, workable piece of legislation that safeguards public health without cutting American citizens off from the benefits offered by new chemicals either from home or abroad. In doing so, we remain open to a full partnership with other countries. We want their cooperation, and we want their competition. Both are necessary to give their citizens and ours the chemical controls they deserve. □

Opposite: Protective gear helps ensure the well-being of industrial workers. *(See P. 12)*

Back cover: Industry and government researchers work to make new products safer. *(See P. 2)*



United States
Environmental Protection
Agency
Washington, D.C. 20460

Official Business
Penalty for Private Use $300

Postage and
Fees Paid
Environmental
Protection
Agency
EPA 335

Third Class
Bulk

Return this page if you do not wish to receive this publication ( ), or if a change of address is needed ( ), list change, including zip code.