

Lead paint is an inside problem

Producers are willing to cut lead content of interior paints, but some products still have more than voluntary standard

New year could be a troublesome one for paint companies. Jan. 1 marks the end of a 60-day response period to a Food and Drug Administration proposal that will require warning labels on interior paints containing more than 0.5% lead. In addition, the Dept. of Health, Education and Welfare has plans for a nationwide program to test 2,000 samples of paint for lead content and make public its results.

The activity reflects the pressure that has been put on paint manufacturers by environmentalists following Congressional passage of the Lead Paint Poisoning Prevention Act of '70, which provides for "the prompt elimination of lead-based paint from all interior surfaces, partition and exterior surfaces to which children may be commonly exposed, of residential housing."

Since paintmakers have been working under a '35 voluntary standard, 246.1, that limits lead content to 1% in products for interior surfaces, toys and children's furniture, and since H-E-W has not yet implemented regulations, the labeling requirement did not seem to be a problem.

Last summer, however, toxic absorption spectra tests were run in Chicago and New York City on samples of paint purchased in stores. And some of the paint violated city health codes and the voluntary standards. For example, in New York, paint from 23 manufacturers, found in 46 of the 300 stores checked, contained more than 1% lead and had no warning labels, or warnings that were regarded by large dissections of children's toys, toys or residential interiors.

Death in the Zoo. One reason for New York's test program was a report from the New York Zoological Society blaming lead poisoning for the death of a black leopard and the illness of another at Bronx Island Zoo. Eleven of 16 samples of the paint used in the zoo contained 0.61-1.0% lead, although they had been matched to lead-free interior paint.

"I'm in favor of the industry standard," says physician Vincent Colvins, director of New York City's Bureau of Lead Poisoning Control. "The disappointing aspect is that the voluntary standard had appeared to be accepted by the industry. But it was violated by a number of paint companies, including some of the biggest ones. This leaves government regulations where there need not be any, if they do their own policing."

Among the companies cited by New York for violations: Adelphi Paint & Color Works, Pennaco-Sargent, Harris Paint, Penstemon Chemical & Paint, Dufco Division of Celanese Coatings International Paint, Glidden, Benjamin Moore, Sepulch and PPG.

Old Paints. Typical function of the paint companies was that the samples tested were old. Glidden, for example, says that some of the paint had not been made since '36; most are emulsions that went through reformulation as late as '70.

And PPG says its investigation found that some paint in a store in question were at least 10 years old.

The company "immediately picked up the offending paint. Those with more than 1% lead content were removed from the market and new labels were put on cans that did not adequately fit lead content but did fit most of the labeling standards."

Lead Challenge. The New York and Chicago test runs as a surprise to the National Paint & Coatings Ass. (formerly the National Paint, Varnish and Lacquer Ass.), which had believed the industry was adhering to 246.1. Though it surmised as much as New York's test ("Some of the products were old inventory or no longer manufactured . . . the method of sampling, and perhaps even the method of testing, could be challenged"), NFCA acknowledged the effect of the test in its newsletter-newspaper with the statement: "We have lost credibility."

"The industry has worked diligently for many years to combat irresponsible, uninformal publicity regarding lead in our products. . . . In spite of the industry's best efforts to insure that their products comply with the voluntary 1% standard for lead in interior paint products, there exists in the marketplace products which do not meet this standard. . . . There simply is no defense at this point in time for a failure to comply," said Robert Roland, executive vice-president of NFCA.

The association is sponsoring a film being made in Chicago on how to prevent and treat lead poisoning. And both NFCA and the Lead Industries Ass. support FDA's proposed regulation restricting lead in interior paints to 0.5% from 1%. The regulation would not cover paint for external or industrial use, in which lead goes to high concentrations.



PAINTER SUSPECTS calling of residence, and can lead-free paint required by code.

Offending Colors. Most of the paint New York found in violation of its code were basic lead-pigment colors—reds, oranges, yellows and greens. Some of the colors, the deep yellows, for example, may have to be eliminated, says one industry member, because reds and oranges are not good enough or they are too expensive.

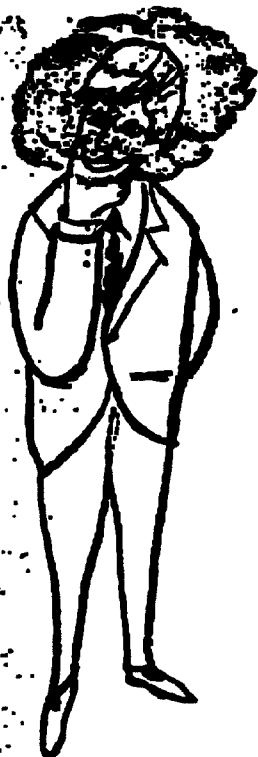
Suppliers generally agree that lead pigments are best for color, opacity and durability. Nonlead pigments usually have to be mixed with titanium dioxide to provide opacity, which adds to cost and tends to lighten the color. And many paints require reformulation.

Among the substitutes: organic dyes. For example, diarylides and chelated-dioxime yellow can replace lead chromate yellow; diazotization oranges, for lead chromate and methylate orange; pure red, isobutyl, chlorinated paraffin red, naphthols, pyrazolones, for red lead; ferric yellow and phthalocyanines blue and green and chrome oxide green, for green. Cost can range from \$2-3/lb.

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Primary Victims: Lead-containing paints can cause plumbism (i.e., lead poisoning) if ingested. And the primary victims are children under 5, who are afflicted with pica—a craving for nonfoods such as paint chips, newspapers. The problem is concentrated in poverty areas, where tenement walls often have flaking paint. Ironically, many of these tenements are in also well-to-do areas, where former owners used high-quality paint, which until the '40s were based on toxic white lead carbonates and sulfates.

Children with lead concentrations of 0.55 mg./100 ml. in their blood are usually treated with agents such as EDTA (the calcium salt of ethylenediamine tetraacetic acid), penicillamine and dimercaprol (BAL), chelating agents.

But Grov Chemical is developing a lead additive that should be on the market within about nine months. It's an EDTA-BAL complex, which can be formulated into paints used to coat surfaces that have high lead content. According to Felix Kischmidt, a consultant for Grov, if a child eats paint chips, the additive in the new paint layer will convert the lead in the old layer, chelate it for excretion in the urine.

Aceto Chemical has applied for a patent on a dynamic blurring agent for treating old painted walls. The materials convert the present mass of lead paint to a blurrier one. Of the several materials Aceto has been working with, various emulsions and mixtures of lipids will be commercialized.

BLPC's Gubins questions have motivated a blurring agent will be. "If the problem is that people eat paint because it tastes good, the answer would be to make it taste bad or repulsive. But people who drink Scotch whisky are drinking something basically repulsive—and they keep on. I don't think you can make something that tastes bad enough to keep someone with pipe from eating it."

Industry, Too: Although most industrial operations resist primers are lead based, nonlead products are making some headway. For example, the Division of Bay Toll Coatings in San Francisco has begun using emulsion systems of isopropyl or organic zinc primer with vinyl finish coats for its seven bridges.

But some health officials don't agree against lead paint for structural use. Gubins says, "We should be approaching the paint where we don't use lead paint on things where children are. But I don't say they can't keep using lead on things like the George Washington Bridge—until they turn it into a dry-cure coating."

CSMA talks regulation

The speakers' roster at last week's Chemical Specialties Manufacturers Assn. meeting at the Sheraton Hotel in Washington, D.C., was loaded liberally with federal government officials. And the moral obligations of the manufacturers was the topic that set the tone.

Case in point: a talk by Malcolm Jensen, director of the Food and Drug Administration's Bureau of Product Safety. Jensen described himself as a regulator who prefers voluntary action to regulation. But he made it quite clear that household chemical manufacturers and drug producers must develop and follow voluntary standards on poisons and packaging to protect children from accidental ingestion of products. Otherwise, he emphasized, the federal government will do so by expanding packaging legislation as it pertains to poisons.

"Nobody wants to do anything that puts a child in hazard," Jensen said. "But there has been little done by makers of household chemicals and drugs to move ahead of government regulations."

Among his suggestions: "I'm not sure it's wise to continue using food-type colors and flavors in household products. Why not a voluntary discontinuation of the practice?"

He also thought industry could set aside a small amount of its total advertising dollars for a general message to "keep household chemicals out of reach of children." And he suggested voluntary labeling standards, perhaps using symbols to convey the message.

Jensen's bureau is also trying industry to help develop mechanical tests for child-safe packaging. Under present methods, the manufacturers ask groups of children and adults to test package closures.

Auto Survey: CSMA's Transportation Products Division presented results of its '70 survey. In liquid polishes, car polish production was up 3% from '69; polish-cleaner, down 11%; wax-cleaner, down 47%. In paste waxes, output of firm and prefinished auto wax was up 19.5%; combustion chamber-waxes, down 25%; detergent-resistant paste, up 6.5%; armor-patch and wax, down 65%. Production of chrome cleaners rose 2.6%; prewash cleaners, 6.7%. There were increases in output of all windshield preparations: 16-oz. washer concentrates, 15%; 16-oz. to 1-gal. premix, 36.4%; 1-gal. premix, 19%. The ammonia-transaminase additive production was up 19.5%; combustion-chamber additive, up 65.5%; carburetor cleaners, up 4%; PCV cleaners, down 10%.

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port, considering the source in the Cabinet Office, will express views acceptable to the Cabinet. Recommendations that some of the research councils be modified seem possible. And there is speculation that the Rothschild report may suggest that the structure of government science be changed so that at least some research will be handled in a way that conforms more closely to that employed in large corporations with successful research programs (such as Shell and British Petroleum). This would mean the adoption of a form of contractor-customer relationship, with a greater separation of roles between those who decide which research should be done and those who perform the research.

The scientific enterprise in Britain differs from its American counterpart in that it is designed to answer the helm more smartly. Pluralism in America

through a variety of government agencies at the federal, state, and even the local level, as well as by private foundations and industry and by discretionary funds controlled by universities both public and private. The British have a system of national universities, with the bulk of funds for science being provided by Parliament. The University Grants Committee distributes funds for capital and operating budgets and thereby controls not only the size of faculties and the number of places for students, but the emphasis on particular disciplines. The research councils, at least until now, have exercised control over funds for research and graduate education. The British, therefore, have a centralized system that should be relatively responsive to changes in policy.

When this was written, speculation in Britain centered on the question of if

financially it is possible to make science more public. Although experienced teachers skepticism toward the potency of reports, even by blue ribbon panels, some responsible people in Britain believe that a damaging overcorrection in science policy is possible. While the influence of the scientists and the inertia in the system should not be underestimated, it is evident that the era of the blank check for science is at an end.

There are obviously some important similarities between those issues being raised in Britain and in the United States. The recent appointment of William M. Magruder (Science, 23 Oct.), as a special consultant to the President on ways to promote technological pay-offs is a sign of the times in Washington. So it is fair to say that the concern in Britain is of special interest in the United States.—JOHN WALSH

Lead Poisoning: Combating the Threat from the Air

New York. There will likely be lead in the air here and in other cities for many years to come. On 5 November, New York City's Environmental Protection Agency will hear an appeal from Mobil Oil Company to hold back on the city's requirement for a phase-out of all lead antiknock compounds in gasoline sold in the city. Passed last August by the city council, New York's antilead ordinance requires a stepwise reduction to 2 grams of lead per gallon of premium gasoline and 1.5 per gallon of regular this month, and to no lead in any gasoline by 1 January 1974.

The New York law is, to date, the only antilead regulation in the country, and the fight that will surround New York's efforts to implement it is likely to be reflected in similar efforts to eliminate lead from gasoline in other locations and on a nationwide basis.

Mobil objects to the law, according to a spokesman for the company, both because the timing requires unreasonable expenditures for the company, and because the federal Environmental Protection Agency (EPA) will soon pass

regulations superseding the New York City law. If the city denies Mobil's request for a variance from the regulations, the company is likely to appeal through the courts.

Ira Auerbach of EPA's air pollution control office told Science that EPA will publish some sort of lead-control regulations by the middle of December, with 30 or more additional days allowed for comments. The regulations, he said, are not yet agreed upon. They could be based on one law or on a combination of laws focusing on auto emissions or on lead's threat to health and safety, or both. At the very least, the federal lead-control rules will require that lead-free or low-lead gasoline be available for 1975 model cars, which will be fitted with lead-sensitive catalytic mufflers to control polluting emissions. Depending on their nature, the federal rules could supersede any state or local laws, but this will not necessarily be the case.

Over 150,000 tons of lead annually pour into the air in the United States from the tail pipes of automobiles,

trucks, and buses. Lead poisoning, originally an occupational disease, has also become a disease of urban slum children, who eat the paint crumbling off the walls of dilapidated housing. In recent years, moreover, concern has mounted over the possible effects on health of the poisonous metal in the atmosphere—particularly in urban areas where lead is often found in the air, dust, and soil in levels that many experts believe to be unsafe.

While the scientific data implicating airborne lead in the concentrations found in our cities as a threat to health are as yet incomplete, few would argue that the lead residues in our environment serve anything but detrimental functions. A position paper from EPA's Bureau of Air Pollution Sciences declared that lead in the air does indeed pose a hazard, particularly to children exposed to lead from other sources. "The magnitude of the problem," the report said, "hardly justifies a 'wait and see' attitude, for acute poisoning is associated with a high percentage of irreversible central nervous damage in children, and repeated exposure to high environmental levels of lead greatly increases the risk of irreversible damage."

Similarly, a report prepared for EPA by a committee of the National Research Council found that "the level of lead in ambient air poses a significant threat" to infants and small children. The same report noted that "the

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... the largest American cities had a concentration of lead 20 times greater than the air over sparsely populated areas of the country and 2000 times greater than the air over the mid-Pacific Ocean."

In New York City, for example, the air measure at 10-story heights around the city varies from 1.2 to 2.7 micrograms of lead per cubic meter of air. But as the measuring devices are put closer to the traffic, the lead levels rise. Measurements taken 10 feet above the ground at 45th Street and Lexington Avenue showed a 24-hour average of 7.5 micrograms, with some readings as high as 34 micrograms.

On 9 July, *Science* reported that investigators at the New York Medical College discovered a number of animals at the Staten Island Zoo to be suffering from lead poisoning, with atmospheric lead suspected as one of the major contaminants. The same investigators discovered that the dirt and leaves in the park surrounding the zoo contained as much as 6000 micrograms of lead per gram of dry weight—an amount equal to or exceeding the levels found alongside heavily traveled expressways.

Yet zoo animals might not be the only victims of New York's leaded atmosphere. Early this year, two children living on the West Side of New York, 3-year-old Joshua Guenter and 17-month-old Natasha Babayan, were found to have lead concentrations in excess of 40 micrograms per 100 milligrams of blood—a value considered by New York health officials to be the upper range of normal. Neither child exhibited symptoms of lead poisoning, which can occur at a concentration of 60 micrograms. Nor were the concentrations in Joshua's and Natasha's blood especially unique. Some 25 percent of the 80,000 preschool children screened by the New York City lead testing program had lead concentrations of 40 micrograms or greater. What makes the case of Joshua and Natasha unique is that both came from middle-class homes, where there is apparently no peeling leaded paint on the walls for children to nibble.

At the insistence of Joshua's father, who is a district Democratic leader, the city's Department of Air Resources sampled the air both inside and outside the Guenter home and found surprisingly high concentrations of lead. Inside, the air showed an average of 2.5 micrograms of lead per cubic meter of air, with a peak reading of 6.1 micrograms. The outdoor average was 3.4

micrograms, with a high reading of 10 micrograms.

Exact correlations in the numbers game of lead in the air and lead in the body have not been determined, but studies have shown that people in occupations such as traffic policeman and garage mechanic carry greater burdens of body lead than is average for the population. Further, residents of homes within 250 feet of expressways are known to have more lead in their bodies than those living a mile or more away. An atmosphere of 6 micrograms of lead per cubic meter of air has been experimentally shown to increase coproporphyrin excretion (an indication of lead

intake) in 11-year-old children. And an atmosphere of only 2.6 micrograms over a 15-month period increased the lead concentration in the bones of mice.

The poison paper from the Bureau of Air Pollution Sciences of EPA pointed out that, because of their higher metabolic rates, children would be more at risk from a given level of airborne lead pollution than adults would. "Under conditions of comparable environmental exposure," said the report, "a child would inhale two to three times as much of a given pollutant as would an adult on the basis of body weight."

City health officials are nonetheless skeptical that an imminent danger ex-

Reaction on Morningside Heights

There may yet be nuclear fusion in Morningside Heights. On 27 October, the Atomic Energy Commission's Atomic Safety and Licensing Board heard arguments in an appeal to its earlier decision denying Columbia University a permit to operate a small nuclear reactor on the university campus.

Among those testifying at the appeals hearing was Ernest J. Sternglass of the University of Pittsburgh, who presented data purporting to show an increase in infant mortality in communities surrounding reactors similar to the 250-kilowatt Triga Mark II that Columbia hopes to operate.

Following 7 years of legal wrangling and intense opposition to Columbia's plans from a number of community and student groups, the licensing board's decision last April marked the first denial of an operating permit for a reactor in the United States.

The community groups, led by the Riverside Democrats, Inc., and the Morningside Renewal Council, Inc., had argued that the risk to the surrounding community—either from the small amount of radioactivity released by the reactor or from a massive rupture of one or more of the core elements—far outweighed any benefits to the community. Columbia and the AEC (which supported the university's application) countered by claiming that the risks were small enough to be virtually nonexistent and that the community, though not necessarily those in the immediate vicinity, would receive such benefits from the reactor as radioactive isotopes for medicine.

In denying the permit, however, the licensing board refused to consider the risk-versus-benefit issue, citing instead a lack of clear standards for licensing a small reactor in a metropolitan area. Columbia and the AEC in their appeal claimed that such standards do, in fact, exist for larger reactors and should be applicable in this case.

The community groups also appealed portions of the original decision, even though it was in their favor. They claimed the board should have dealt with the risks-versus-benefits issue and that Columbia should have filed an environmental impact statement. Sternglass's testimony was offered as further proof of the risks to the community from the reactor.

When the licensing board agreed to hear Sternglass, however, they stated that his evidence would be considered only as a challenge to AEC standards for the levels of emissions from reactors and not as a specific argument against the Columbia reactor. The AEC submitted a mass of data to the licensing board supposedly countering Sternglass's findings.

The decision of the board is not expected for several weeks. The next step in the appeal process is the U.S. District Court of Appeals.—R.J.B.

its from breathing the polluted air. "I would call it a potential problem with the recent on potential," said Vincent Guinee, director of New York's lead poisoning prevention program.

Guinee points to a lack of correlation between these areas of the city high in atmospheric lead and the cases he discovers through his screening program. Moreover, the incidence of lead poisoning peaks in 2-year-old children—in apparent correlation with their chewing habits. If the lead were coming simply from environmental exposure, reasons Guinee, the incidence would increase with age. Guinee and other city officials are reluctant to jump to any conclusions concerning Joshua and Naima because of the variety of substances that contain lead, including pencil paint, some house paints sold as lead-free, and a variety of substances such as certain plastics used in children's toys. Also, a good deal of the lead in the dirt and dust in the city originates when old housing is torn down.

Less skeptical about the danger from lead in the air is a group of parents, calling themselves the "Get the Lead Out Committee," who banded together following the discovery of high concentrations of lead in the blood of middle-class children. "It's clear to me," said Paul Du Brul, an assistant to the Bronx Borough president and spokesman for the group. "That there are too damn many kids with too damn much lead in their bodies."

The Get the Lead Out Committee is pressing the city to initiate a massive program to sample the air at ground level and correlate the findings with epidemiological data on lead levels. City officials say they would undertake such a study if they had the staff funds. The committee also intends to keep up the pressure to get lead removed from gasoline. Says Du Brul, "We have to say no to the automobile industry. We've already done incalculable damage to our children."

The possible effects of subclinical doses of lead in children's bodies remain virtually unknown. Yet because of the wide range of effects on the body caused by higher dosages of lead, some pediatricians fear that the lead is unlikely to be totally harmless.

Moreover, studies have shown that lead does accumulate in the bodies of adults (in the United States, but not abroad) the longer they live. And this accumulation may be passed on from generation to generation. Shirahai Saka-

Correction

An article in *Science* (29 October, page 479) which alluded critically to a political appointee in a State Department environmental advisory committee, incorrectly identified the appointee as Mrs. Bruce B. Benson, president of the League of Women Voters. *Science* regrets the error and any injury done to Mrs. Benson's reputation and that of the League, and recognizes that they play respected roles in many governmental issues.

hades and Joseph Kochen, pediatricians at the Martin Luther King Health Center in the Bronx, are testing a number of newborn babies and finding most of them with lead concentrations of 20 and 30 micrograms per 100 milligrams of blood—concentrations similar to those found in their mothers. Thus children born in an urban environment may carry an elevated concentration of lead from birth, and thus be more susceptible to contamination from any source.

Added to the accumulation of lead from a steady environment is the problem that the concentration of lead in the air is actually increasing in several locations. Preliminary data from the industry-supported Seven Cities Study of Air and Population Lead Levels reveal that between 1961-62 and 1968-69 airborne lead concentrations at some sampling stations rose by as much as 32 percent in Cincinnati, 35 percent in Philadelphia, and 64 percent in Los Angeles. A recent study of the air on a mountain above San Diego shows the level to be rising by 5 percent per year. Isomeric studies of this airborne lead indicate that virtually all of it is the product of emissions from internal combustion engines.

Clearly, lead in the air presents a hazard—if not now, then in the near future. The next move is up to the EPA, with the new lead-control regulations to be published next month. Removal of lead from gasoline would involve massive economic considerations, and the EPA regulations, no matter how weak or how stringent, are likely to be the subject of intense squabbling for some time to come.

"And in the meantime," asks Mrs. Laura Sullivan, who is the head of the Get the Lead Out Committee, "just what is happening to the kids?"

—RICHARD J. BAZELL

APPOINTMENTS

Heidi C. Washin, chairman, ocean engineering department, Woods Hole Oceanographic Institution, to chairman, ocean engineering department, University of Miami. . . . Hugh D. Graham, acting director, Institute of Southern History, Johns Hopkins University, to chairman, social sciences division, University of Maryland, Baltimore County. . . . Harry L. Holloway, Jr., professor of biology, Western Maryland College, to chairman, biology department, University of North Dakota. . . . Jerome J. DeCose, professor of surgery, School of Medicine, Case Western Reserve University, to chairman, surgery division, Medical College of Wisconsin. . . . Gilbert J. Malin, professor of physics and chemistry, University of Detroit, to chairman, chemistry department, Oklahoma State University. . . . Alexander Gottlieb, professor of radiology, University of Chicago, to chairman, radiology department, biological sciences division at the university and the Pritzker School of Medicine. . . . Clayton Rich, associate dean for research and clinical affairs, University of Washington School of Medicine, to dean, Stanford University School of Medicine and vice president for medical affairs. . . . Donald L. Kimmel, Jr., assistant professor of medical sciences, Brown University, to chairman, biology department, Davidson College. . . . Ronald F. Keady, assistant professor of education, George Peabody College for Teachers, to chairman, education department, Frostburg State College. . . . Kenneth G. Kosh, dean, Penn State University, to chairman, education department, Hendrix College. . . . Byung-suh L. Kim, chairman, sociology department, Coe College, to chairman, sociology department, Monclair State College. . . . Ellis R. Mottet, director of the technology assessment project, George Washington University, to science adviser, Senate Committee on Labor and Public Welfare. . . . Armand J. Sila, associate professor of civil engineering, Worcester Polytechnic Institute, to head, civil engineering department at the institute. . . . David Brody, professor of anatomy, State University of New York, Buffalo, to chairman, anatomy department at the university. . . . Russell C. Jones, professor of civil engineering, M.I.T., to chairman, civil engineering department, Ohio State University.

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