

An Element of Doubt


Disinterested research casts doubt on claims that lead poisoning from paint is widespread among American children. Ironically, lead-paint removal can be a cause of poisoning

ELLEN RUPPEL SHELL | DECEMBER 1995 ISSUE

Lead is among the most revered and the most maligned of elements. Historically its beneficent properties have made it hard to resist, though its virulence is the stuff of legend. Lead was added to cosmetics and eye salves in predynastic Egypt, and prescribed as a cure for fever, rash, indigestion, and lust in ancient Rome. The Roman naturalist Pliny the Elder cautioned that "all the current instructions on the subject of [lead's] employment for medicinal purposes are in my opinion decidedly risky." But his warning went largely unheeded by the Roman nobility, whose habit of drinking potions sweetened with "sugar of lead" is said to have hastened the toppling of their empire.

Lead acquired new uses in the industrial age with the mass manufacture of lead solder, lead pipe, and lead-tinted pigments for glazes and paints. The mineral's high density made it a natural to be used for bullets and shot, and its malleability rendered it an ideal material for type--in which context it came to the attention of Benjamin Franklin. Citing his own "lead colic," brought on by frequent encounters with the printing press, Franklin wrote, "The mischievous Effect from lead is at least above Sixty Years old; and you will observe with Concern how long a useful truth may be known, and exist, before it is generally received and practis'd on."

Franklin was right on the mark. Although some of lead's applications waned with reports of its toxicity (for example, the French banned the manufacture of leaded white pigments in the mid-1800s for fear of poisoning craftsmen), new uses for the mineral continued to pop up well into the twentieth century: lead tubes for toothpaste, lead sheathing for electrical wire, lead shields for x-ray machines, lead plates for batteries, and lead and more lead in paint smeared on everything from boat bottoms to baby carriages. By the early 1930s severe lead poisoning, characterized by convulsions, coma, brain damage, and death, was recognized as a fairly common disease of childhood. The paint industry began voluntarily to reduce the amount of lead in its products in the following decade, but the discovery of tetra-ethyl lead as an anti-knock additive for gasoline increased lead mining worldwide. Sales of leaded gasoline rose steadily through the 1960s, with a resulting dispersion into the environment of millions of tons of lead from car exhaust. Meanwhile, more than 150 clinics were set up nationwide to deal with a steady stream of lead-poisoning cases. Like the Romans, it seemed, we had entered into a devil's wager with lead, using the public health as our stake.

All that, of course, has changed. Over the past quarter century Americans not only have kicked the lead habit but have turned on lead with the zeal of the betrayed. Congress banned lead-based paint for residential use in 1978, and by 1990 the amount of lead in gasoline had dropped 99.8 percent from mid-1970s levels. Also in 1990 cans with lead seams, no longer manufactured in this country, constituted less than one percent of the market; copper or plastic pipes, not lead ones, were standard in plumbing; lead solder had been banned; and lead smelters and industries that used lead had been forced to limit their emissions sharply. Blood-lead levels, measured in micrograms of lead per deciliter of blood, dropped accordingly. In July of 

Pockets of lead poisoning remained, mostly in the inner city, but generally the numbers were cheering: the survey concluded that only one half of one percent of children who were tested had blood-lead levels exceeding the "intervention level" set in 1985 by the Centers for Disease Control and Prevention.

This triumph over lead is widely touted as one of the great public-health success stories of the century, a stunning example of the strength of activism over vested interests. But many are unwilling to declare victory. The Environmental Protection Agency and the [Department of Health and Human Services](#) say that lead poisoning continues to be the No. 1 "environmental disease of children, affecting at least ten percent of all preschoolers." The CDC calls lead poisoning the "most common and societally devastating environmental disease of young children." And an influential Washington lobby, the Alliance to End Childhood Lead Poisoning, states as "inescapable fact" that "approximately ten percent of all U.S. preschoolers are lead-poisoned, eclipsing other environmental health hazards and preventable childhood diseases." Other groups and the media have picked up the chant, citing widespread low-level lead poisoning as the trigger for ills ranging from attention-deficit disorder to juvenile violence.

Despite the impressive roster of medical and scientific organizations supporting these claims, however, the characterization of lead poisoning as a "silent epidemic" is not a scientific truth but a rhetorical pose. Symptomatic lead exposure that causes clear clinical effects of mental or physical impairment is exceedingly rare. Even moderate blood-lead elevations, at the CDC's 1985 intervention level, are also quite uncommon. To get to the "one out of ten preschoolers" figure, regulatory agencies now deem as "poisoned"



in 1991 the CDC changed "lead poisoning" from a clear diagnosis to a murky condition, thereby enlarging eighteenfold the likely population at risk and encouraging the enactment of sweeping anti-lead legislation. Sanford Weiner, a specialist in risk assessment at the Center for International Studies at the Massachusetts Institute of Technology, puts it this way: "The agencies moved the goalposts."



The CDC justified the new lead threshold by citing "scientific evidence" that "some adverse effects occur at blood-lead levels at least as low as 10 micrograms per deciliter in children," and adding that this evidence is "so overwhelming and compelling that it must be a major force in determining how we approach childhood lead exposure." But the evidence, while provocative, is hardly conclusive. Lead epidemiology is plagued by inconsistencies, largely because exposure to lead correlates so neatly with a number of other factors known to affect children's intelligence and psychological development. Generally speaking, children of lower socioeconomic status are more likely to be exposed to lead than are children of higher socioeconomic status, and they are likely to have higher blood-lead levels. Low socioeconomic status is itself a risk factor for poor performance on intelligence and developmental tests. Therefore it's not clear whether lead is causing deficits or simply acting as a marker for other factors known to affect performance. In a commentary in the March, 1993, issue of the *Physicians for Social Responsibility Quarterly*, the developmental psychologist Sandra Scarr, the Commonwealth Professor of Psychology at the University of Virginia, wrote, "The child's heredity and environment are correlated with lead exposure such that it is extremely difficult, if not theoretically impossible, to disentangle the effects of the child's broader biology and ecology from lead exposure." Studies that have attempted to separate out the factors are, usually by their own authors' admission, imperfect. A review of the scientific literature on lead published in the *British Medical Journal* last year concluded,

Uncertainty remains as to the real impact that lead makes on



doubt, the priority that should be devoted to detection and intervention on children with moderately increased blood lead, compared with other social influences on childhood development, is open to debate.

The Australian scientist Peter Baghurst, one of the authors of that paper, contributed to another study cited by the CDC and other experts as providing proof for the theory that low-level lead is dangerous. One of Baghurst's co-authors on the former paper, the psychologist Marjorie Smith, who is the acting director of the Thomas Coram Research Unit at the Institute of Education at London University, says that comments such as those made by the CDC are typical of the tendency to exaggerate the impact of low-level lead exposure.

"We looked at more than twenty-six epidemiological studies conducted since 1979, and found that the effect of lead at low levels on IQ was consistently the smallest of any of the factors that have been studied," Smith says. Low-level blood lead was linked to slight deficits in some psychometric measures, but these effects were so small (about one IQ point, on average) that it was impossible to determine what caused them, or if they had any real significance. In any case, the effect of lead was swamped by every other variable. For example, birth order and parental education had several times the impact on IQ of low-level blood lead, as did the amount of parental attention.

"What could be concluded was that parents should worry less about low-level blood lead and more about reading their children bedtime stories," Smith



ACTUALLY, no scientific consensus on the issue exists even in the United States. Abraham Wolf, an assistant professor of psychology at Case Western Reserve School of Medicine, has studied the effects of low-level lead exposure. "There is no question that lead at high levels is dangerous," he says. "But the scientific literature does not support the claim that a child will be retarded in any way by low levels." And Birt Harvey, the chairman of the Department of Pediatrics at Stanford University, wrote in the February, 1994, issue of the journal *Pediatrics* that "for children with blood-lead levels between ten and twenty micrograms, evidence is lacking of a clinically significant effect of recommended interventions to reduce blood lead or of an effect if blood lead is reduced." Harvey's criticism was aimed specifically at CDC recommendations calling for universal lead screening of young children. According to the recommendations, children should be screened unless it is shown that the neighborhood they live in does not have a lead-poisoning problem. Harvey pointed out that the only way to prove that a neighborhood has no lead problem is to screen the children who live in it. This Catch-22 means that essentially all children must be screened, sometimes repeatedly, regardless of where they live.

One of the few nationally known studies of lead screening to have been done was published in the *Journal of the American Medical Association* in 1993. It found only six of 5,115 poor children screened in Orange County, California, to have blood-lead levels above 25 micrograms. Of these, two had been exposed to lead from Mexican folk remedies. The cost of uncovering these cases was estimated to be more than \$19,000 each. Another study, of suburban children living outside St. Paul, Minneapolis, and Chicago, found that about one tenth of one percent of children screened had blood-lead levels higher than 20 micrograms. Suburban children do get elevated levels,



of poisonings. In general, lead poisoning is closely related to poverty. Joel Schwartz, an associate professor of environmental epidemiology at the Harvard School of Public Health and a CDC adviser on lead, explains why this fact is so often obscured by anti-lead lobbyists.

"If you say lead is a problem of poor minority kids, then the rest of society will say, 'The heck with them,'" Schwartz says. "That's why people push universal screening. But if you look at the cost-benefit, and where exposure is likely to take place, you have to target screening. Black children have double the risk of elevated blood-lead levels that white children of similar socioeconomic level have, so race has to be a consideration in the screening process whether it's politically correct or not."

Edgar J. Schoen, the medical director of regional perinatal screening for the Kaiser Permanente Medical Care Program in Oakland, California, is a longtime critic of universal screening. "Screening all infants and toddlers for lead is a terribly wasteful proposal," he says. "The way to address the pockets of lead poisoning that still occur is not by performing tests on as many as sixteen million children a year, at a cost of hundreds of millions of dollars."

Herbert Needleman, formerly the chairman of the board of the Alliance to End Childhood Lead Poisoning, and a professor of pediatrics and psychiatry at the University of Pittsburgh, says that such assertions are "uninformed." "Many in the American Academy of Pediatrics do not think lead poisoning is a problem," he says. "They've balked at universal screening because it alarms parents and the prevalence is low. But to back off now would be to lose momentum to wipe the disease out--something we could do in ten to twenty years if we keep at it."



developmental tests, is referred to in virtually every analysis of the lead issue, including the 1991 CDC recommendations. His more recent work, showing that very low blood-lead levels at age two are powerfully associated with intelligence and well-being later in life, helped to bring about the country's increasingly stringent lead policy. (Needleman's co-author David Bellinger, a psychologist at Harvard Medical School, says that a subsequent study showed about a six-point IQ deficit at age ten for every 10 micrograms per deciliter at age two.) Such findings have prompted Needleman to call for removal of lead paint from the nation's housing stock.

"We need to start by carefully deleading all houses with lead paint that's peeling, which would cost about thirty billion dollars," Needleman says. "We then need to continue to get the lead out of remaining structures, because all paint peels eventually."

But although he is lauded for his crusade by policymakers, journalists, and child advocates, Needleman has come under heavy fire from scientists. In 1983 an EPA expert committee criticized Needleman's 1979 paper for faulty methods and improper conclusions. In 1992 a committee of his colleagues at the University of Pittsburgh found him guilty of deliberately misrepresenting procedures used in the same study. The Pittsburgh panel suggested that Needleman misrepresented his methods so that his study "would appear to be a more adequate basis for public policy regarding environmental controls for lead." Needleman has disputed the charge of deliberate misrepresentation and is seeking in a lawsuit to have it withdrawn.

Needleman's impact on lead policy has in any event been enormous. In 1992, owing largely to the influence of his work and the lobbying efforts of the alliance, Congress passed the Residential Lead-Based Paint Hazard



paint.

Title X charges the EPA with developing regulations governing lead-paint abatement and authorizes the states to administer and enforce them. It also stipulates that starting next year owners of homes built before 1978 must alert potential buyers or renters to the presence of lead paint, and if lead is present provide them with a lead-hazard information pamphlet. Real-estate agents must also come forward with this information, and if they fail to do so will be liable for both civil and criminal penalties. Advocates predict that enforcement of Title X will harness market forces to put pressure on landlords and homeowners to make their buildings "lead-safe" before attempting real-estate transactions. According to a report prepared by the alliance and the Conservation Law Foundation, "Ultimately, market mechanisms will ensure that properties that are not lead-safe are valued less by purchasers and appraisers than properties that are lead-safe." But since homeowners who know they have lead hazards will be required by law to reveal them, and those who don't know will not be required to find out, some argue that the new law will have, if anything, a chilling effect.

"How many people are going to spend two or three hundred dollars to get their homes tested just so that they can tell a prospective buyer that they have lead hazards?" says Joshua Cohen, an environmental consultant in Cambridge, Massachusetts, who specialized in lead research when he was a fellow at the Harvard Center for Risk Analysis. "My guess is, if anything, the law will be a disincentive to test for lead."

Approximately 65 percent of all residences in this country, including 60.8 million privately owned houses and apartments, contain lead paint, and, according to the Department of Housing and Urban Development, the cost of

the tort system," says the executive director of the alliance, Don Ryan. The idea is that renters will sue landlords who fail to comply with the lead laws--and they will. In Massachusetts, where the lead law is arguably the toughest in the country, landlords who do not control lead hazards are liable for the threat of elevated blood-lead levels in their tenants under age six. Robert Rainer, a personal-injury attorney in Boston, explains that Massachusetts families with young children are entitled to compensation merely for living in a rented apartment that contains lead paint. Last year Rainer won a settlement for a family on the grounds that their apartment contained illegal lead paint. The family included one child under the age of six, whose blood-lead level was zero. "An apartment with lead paint in violation of the Massachusetts lead statute is, by law, not inhabitable by young children," Rainer says. "The question of whether any children are damaged by the paint is an entirely separate issue." An article in the May, 1994, issue of *National Underwriter*, a trade publication for the insurance industry, reported that "the incidence of lead liability claims is exploding."


In Massachusetts--and in Maryland, where lead laws are also tough--fear of litigation has led to a sharp increase in discrimination by landlords against families with children and to the abandonment of housing stock in the inner city, where the cost of lead abatement is often not justified by the rental value of the property. Stephanie Pollack, an attorney with the Conservation Law Foundation who is also a consultant for the board of directors of the alliance and serves on the national CDC lead committee, says that the law is a "double-edged sword" that, despite its drawbacks, has been effective in eliminating lead-paint hazards. Pollack drafted the Lead Poisoning Prevention Act, a model law currently under consideration by advocates and legislators in several states. The act requires child-care centers and some



landlords are doing nothing."

But it's not just landlords who are doing nothing; only a tiny proportion of private homeowners have deleadaded their property, and in Massachusetts a very small number have deleadaded, though until last year homeowners were under a state mandate to do so. Joshua Cohen says that their reluctance to delead is an indication that most people do not consider lead abatement a high priority--at least not when they're the ones paying for it. "Either all these people are ignorant or they've decided it's simply not worth it," he says. "I would assert the latter is the case."

Indeed, Don Ryan lives with his wife and two small children in a 1953 center-entrance colonial that has not been deleadaded. Ryan sees no irony in this. The paint in his house isn't hazardous, he says, because it is not peeling or cracking, and therefore will not flake onto the floor and wind up in his children's mouths. Rental units, he says, are more likely to have what he calls "lead-based-paint hazards."

But determining exactly what constitutes a hazard is a subjective business. The Lead Poisoning Prevention Act defines a lead-based-paint hazard as "any condition that causes exposure to lead from lead-contaminated dust, lead-contaminated soil, lead-based paint that is deteriorated or present in accessible surfaces, friction surfaces, or impact surfaces that would result in adverse human health effects as established by the Department." This definition is broad, and can be interpreted in any number of ways. Philip Berns, who was a fellow in the Lead Poisoning Prevention Project of Bronx Legal Services, says that in the New York City housing code any deterioration of paint constitutes a violation--even a thumbtack hole. Tenants have a right to demand that pre-existing hazards be repaired, and the landlord may be 

is no supervision," Berns says. So, to avoid getting cited or sued, landlords might cover small cracks with plaster or putty and sand the walls, thereby releasing lead-paint dust and contaminating the entire room.

Ryan says that the alliance is not demanding total lead abatement, but "Understanding Title X," an alliance publication, describes the reduction of lead hazards as an "interim measure" and implies that the removal of lead paint should be the nation's ultimate goal. Ellen Silbergeld, a toxicologist at the University of Maryland, the chair of the EPA's National Policy Committee on Lead, and a board member of the alliance, says that although the removal of lead paint may in some instances seem impractical, it can be necessary at times to solve the problem. "Because lead poisoning is so poorly reversed by treatment and because it is so serious, we have to think about primary prevention," she says. Silbergeld's proposal to tax lead by the pound to pay for national abatement efforts left the lead industry fuming and the lead-abatement industry cheering. Olin Jennings, a management consultant in Columbia, New Jersey, who specializes in the lead-abatement industry, predicts that its market will grow rapidly, propelled by Title X and resulting litigation. In a 1991 business analysis he reported that the total potential market for contracting and testing services would hover at \$600 billion. But Jennings went on to warn that

Asbestos abatement contractors and consultants have been entering the market as an "easy" diversification out of the troubled asbestos market. Intense competition from unqualified and untrained painting and interior remodeling contractors is also



purchase on price.

Indeed, studies have pointed to lead-paint abatement as a major *cause* of lead poisoning. In a study published in the November, 1991, issue of *Pediatrics*, Yona Amitai, a physician who was then in the division of pharmacology and toxicology at the Children's Hospital Medical Center in Boston, reported that "deleading resulted in a significant, albeit transient, increase in blood lead levels." Children in the study averaged 36.4 micrograms per deciliter before deleading took place, and 42.1 micrograms while deleading took place. Blood-lead levels increased as much as 200 percent during deleading, with the result that forty-two of the 114 children had to be chelated--that is, had to have lead chemically flushed from their blood.


Mark Farfel, a researcher at the Johns Hopkins School of Hygiene and Public Health and the director of the lead-abatement program at the Kennedy Krieger Institute, says that improperly done lead-paint abatement can force tenfold to hundredfold transient increases in lead-dust levels and a subsequent spike in blood-lead levels. "According to Maryland state law, if owners control lead hazards in their houses they get limited liability in court," he says. "However, the package of [abatement] procedures recommended by the state has not yet been proven effective scientifically." Farfel is currently doing a study to see what effect, if any, various levels of abatement will have on children's blood-lead levels. Meanwhile, despite rhetoric to the contrary, there is little evidence that the removal of lead paint will significantly reduce the incidence of lead poisoning in children. Some experts argue that in fact lead-paint abatement is not even the most important step to take to continue solving the nation's problem, and that its pursuit supports the ideological goal



It is not lead paint per se but lead dust that causes the bulk of lead exposure in human beings. Some children gnaw on porch rails and windowsills, swallowing paint chips as they chew, but most kids get their lead from the steady ingestion of leaded dust carried on their fingers and hands. Lead gets into dust not only from interior paint but also from deteriorating exterior paint and from soil polluted with decades of leaded-gasoline emissions. Removing interior lead paint does nothing to prevent lead exposure from either of these other sources.

Howard Mielke, an environmental toxicologist at the College of Pharmacy at Xavier University of Louisiana, in New Orleans, and an expert on [lead in soils](#), says that the importance of lead in exterior dust is consistently underrated by federal agencies. Mielke has found that children's blood-lead levels correlate neatly with lead levels in soil near their homes, which in turn correspond with past traffic patterns. The lead that has accumulated in soil is picked up during outdoor play and tracked into the house, where it becomes part of the house dust. This, Mielke says, solves the little-publicized mystery of why so many inner-city children have high blood-lead levels even though their homes contain no lead-paint hazards.

"In 1970, when many cars were getting just ten miles to a gallon in stop-and-go traffic, a busy intersection might have gotten as much as four or five tons of lead dumped on it in a year," he says. "That's roughly equal to having a lead smelter at every major intersection in the United States. As a result, there is a very, very large reservoir of lead in soil."

Mielke's laboratory at Xavier is equipped with a "clean room"--a glassed-in area, like a greenhouse, fitted with air filters. Without the filters, Mielke says, the ambient air would contaminate his tissue and water samples with lead. 

people is "bioavailable" lead, lead that can get into the blood. Lead paint is not bioavailable until it deteriorates into small particles, or is ground into a fine powder by sanding, burning, or scraping, the very processes by which much lead-paint abatement takes place.

Mielke took me for a walk around his neighborhood in New Orleans, a semi-gentrified mixture of tumbledown bungalows and antebellum grand houses. We were scouting for paint dust, and it took us all of three minutes to find a man sanding paint off the windowsills of a house old enough to be his great-grandfather's --and old enough to contain a good amount of lead paint. The man was wearing a pair of baggy shorts and a bandanna, hardly the uniform recommended by the Occupational Safety and Health Administration for working with lead paint. When I asked him if he had thought of using a respirator, he shrugged, smiled, and then offered to paint my house later that week. As we stood and watched, particles of paint floated down from the window like dandruff. Mielke grimaced. "It's against the law to sand leaded paint in New Orleans," he said. "But what city has the means to enforce a law like that?"

Unlike lead in paint, lead from gasoline emissions is almost entirely bioavailable, from the moment it leaves the engine. It becomes part of an aerosol that floats in the air until it hits a surface, such as a tree or a building; then it gradually sinks or gets washed to the ground. This explains why soil-lead levels are sometimes very high near the foundations of buildings in big cities--even the foundations of brick buildings that contain no lead paint. Crumbling exterior lead paint adds to lead buildup in soil. Several studies here and in England have shown that children get large amounts of lead dust on their hands from outside their homes, and research also points to lead in



been published, but the data were re-analyzed by Allan Marcus, a statistician with the EPA's National Center for Environmental Assessment, who says, "It's clear that in places where there are high soil-lead levels outside, most of the lead in dust inside a house comes from the soil. Surface soil is easily scuffed off and turned into surface particles, which are dragged in by shoes, or household pets. In fact, there is a statistical relationship between the number of pets in a household and blood-lead levels."

Brian Davies, a researcher at the University of Bradford, in England, found that in high-traffic areas--particularly in the summer, when windows are left open--large amounts of lead dust blown in from outside accumulate on windowsills in houses that contain no lead paint. Many children's blood lead doubles in the summer even though, presumably, they spend more time outside than they do in other seasons, away from lead-painted walls and windowsills. Many scientists believe that lead must be getting into children's blood from sources other than interior paint. While conceding this point, Don Ryan, of the Alliance to End Childhood Lead Poisoning, says that his organization tries to focus on what it sees as its central mission--getting rid of interior lead-paint hazards. Getting lead out of soil, he says, is unrealistic.

"It costs a fortune to remediate lead-contaminated soil," Ryan says, "so lead in soil is being used by some property owners and real-estate interests as an excuse not to deal with lead in paint at typically high interior levels. We are guarded against the EPA's setting a soil standard that distracts from lead-based-paint housing hazards."

Mielke counters that reducing exterior lead hazards does not necessarily mean removing soil; it can involve measures as simple as covering bare ground with grass or pavement, or installing a sandbox to keep kids from



there's no going back on that," Mielke says. "We can't get rid of it, so we're going to have to learn to live with it." He says that the major cities of Japan used to have very high levels of lead in their dust from leaded gasoline but that Japanese children's blood-lead levels stayed low, because of strict hygienic practices. "No one would think of wearing shoes in a home in Japan," he says. "And every McDonald's has a washbasin close to the entrance that the kids actually use to wash their hands. The Japanese have learned to live in a polluted world."

Sandboxes, doormats, and hand washing might well help reduce lead exposure in many children, but such measures are rarely mentioned by health agencies and advocacy groups. The attractiveness of lead as an advocacy issue is clear--the culprit is well defined, and the costs seem easy to pass along to "bad guy" landlords and industry. But the buck doesn't stop with the bad guys. Pressured by fear of litigation, many landlords are likely to delead units whether or not they are truly hazardous, and to pass the cost and risks of the lead abatement on to renters, the group least able to afford them. The real-estate publication *Banker & Tradesman* reported in January of last year that this is already happening in Massachusetts, where "rent premiums far exceed the amortized cost of deleading a unit."

Ultimately, protecting children against lead may involve both less and more than is currently being recommended by lobbying organizations and mandated by the federal agencies they influence. Regardless of how much lead is in a child's environment, it does no harm until it enters the child. Today lead is not entering most children at a rate that scientists can agree is dangerous. Nevertheless, thousands of mostly inner-city children are exposed to lead in dwellings that are in dire need of rehabilitation not only to



deteriorated paint is professionally removed and the homes are professionally cleaned. But stripping intact lead paint from woodwork should not take priority over patching a leaking roof or fixing a heating system that belches carbon monoxide. Nor should millions be spent on screening children who are at very low risk of lead exposure. Escalating low-level lead exposure into a nationwide "epidemic" has done little to help those children who really are at risk. Only by treating lead poisoning for what it is--largely a disease of the poor--do we stand a chance of beating it.

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