American Journal of Public Health

January 2000, Reprint Volume 90, No. 1 Established 1911

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ABSTRACT

A major source of childhood lead poisoning, still a serious problem in the United States, is paint. The dangers of lead were known even in the 19th century, and the particular dangers to children were documented in the English-language literature as early as 1904. During the first decades of the 20th century, many other countries banned or restricted the use of lead paint for interior painting. Despite this knowledge, the lead industry in the United States did nothing to discourage the use of lead paint on interior walls and woodwork. In fact, beginning in the 1920s, the Lead Industries Association and its members conducted an intensive campaign to promote the use of paint containing white lead, even targeting children in their advertising. It was not until the 1950s that the industry, under increasing pressure, adopted a voluntary standard limiting the amount of lead in interior paints. (*Am J Public Health*. 2000;90:36–46)

According to the Centers for Disease Control and Prevention, it is estimated that 1 of every 20 children in the United States suffers from subclinical lead poisoning,[1] and a recent article in *Science* argues that "paint appears to be the major source of childhood lead poisoning in the United States."[2] Yet it is only during the past 15 years that the history of this tragic situation has been addressed in any detail,[3–7] primarily through the documentation of childhood lead poisoning in the public health and medical literature of the first half of the 20th century. Here we analyze the role and influence of the lead industry in shaping popular and professional opinion about lead and lead paint products. Specifically, we discuss how the Lead Industries Association (LIA, the trade group representing lead pigment manufacturers) and its member companies sought to assuage growing public and professional concerns about the dangers to children of lead-based paint. Often employing the image of children themselves, the LIA and its members engaged in aggressive marketing and advertising campaigns to persuade the public of their product's appropriateness for indoor use.

While some readers of the Journal might put the onus on the public health community for not doing more to stop the use of lead-based paint in homes, schools, hospitals, and other interior spaces where children were exposed, we argue that primary responsibility lies elsewhere. The continuing use of lead paint into and after the 1950s cannot be understood without an appreciation of the enormous resources the lead industry devoted to allaying public health concerns from the 1920s through the early 1950s. Whatever responsibility the public health community had for this tragedy pales in comparison with the power and determination of the industry in perpetuating the use of lead-based paint. The lead industry, as a sponsor of research and as a clearinghouse of information about lead, was positioned to be in the forefront of efforts to prevent lead exposure in children. Instead, the industry placed its own economic interests ahead of the welfare of the nation's children.

Medical Knowledge of the Dangers of Lead-Based Paint

Historians have shown that knowledge of the dangers of lead poisoning to workers and children can be traced back into the 19th century[8,9] and that in the first third of the 20th century a broad scientific literature on the subject accumulated in Australia, England, and the United States. Alice Hamilton and others documented lead hazards among American workers in the pigment manufacturing, battery, painting, plumbing, ceramics, pottery, and other industries.[10,11] In 1921 the president of the National Lead Company, Edward J. Cornish, wrote to David Edsall, the dean of Harvard Medical School, saying that lead manufacturers, as a result of "fifty to sixty years" experience, agreed that "lead is a poison when it enters the stomach of man—whether it comes directly from the ores and mines and smelting works" or from the ordinary forms of carbonate of lead, lead oxides, and sulfate and sulfide of lead.[12]

At the same time, others began to systematically document the dangers of lead to children. In 1904, J. Lockhart Gibson, an Australian, was among the first English-language authors to directly link lead-based

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paint to childhood lead poisoning, specifically noting the dangers to children from painted walls and verandas of houses.[13] A year later, he urged, "[T]he use of lead paint within the reach of children should be prohibited by law."[14(p753)] In 1908 another Australian, Jefferis Turner, delivered a presidential address to the Section of Diseases of Children of the Australasian Medical Congress in which he noted that lead poisoning was due to paint powder that stuck to children's fingers, which they then bit or sucked.[15] In 1914, Americans Henry Thomas and Kenneth Blackfan, the latter a physician at Johns Hopkins Department of Pediatrics in Baltimore, detailed the case of a boy from Baltimore who died of lead poisoning after ingesting white lead paint from the railing of his crib.[16] In 1917, Blackfan reviewed the English-language literature on lead poisoning in children, noting specifically cases of children who chewed the white paint from their cribs.[17] By the mid-1920s, there was strong and ample evidence of the toxicity of lead paint to children, to painters, and to others who worked with lead as studies detailed the harm caused by lead dust, the dangers of cumulative doses of lead, the special vulnerability of children, and the harm lead caused to the nervous system in particular.[18]

Outside the United States, the dangers represented by lead paint manufacturing and application led to many countries' enacting bans or restrictions on the use of white lead for interior paint: France, Belgium, and Austria in 1909; Tunisia and Greece in 1922; Czechoslovakia in 1924; Great Britain, Sweden, and Belgium in 1926; Poland in 1927; Spain and Yugoslavia in 1931; and Cuba in 1934.[19] In 1922, the Third International Labor Conference of the League of Nations recommended the banning of white lead for interior use.[20] In the United States and Canada, there were calls for the use of non–lead-based paints in interiors. As early as 1913, Alice Hamilton wrote that "the total prohibition for lead paint for use in interior work would do more than anything else to improve conditions in the painting trade."[21] By the early 1930s, a consensus developed among specialists that lead paint posed a hazard to children.[22–27] Robert Kehoe, medical director for the Ethyl Gasoline Corporation and director of the Kettering Laboratories of the University of Cincinnati, perhaps the nation's leading expert on lead poisoning, concluded that "strenuous efforts must be devoted to eliminating lead from [children's] environment,"[28] especially since safer alternatives to lead, specifically titanium- and zinc-based paints, existed throughout the late 19th and early 20th centuries. In 1914, the director of the scientific section of the Paint Manufacturers' Association noted with approval the development of "sanitary leadless" paints and predicted that "lead poisoning will be done away with almost entirely."[29]

Despite the accumulating evidence of lead paint's dangers to young children, the industry did nothing to discourage the use of lead paint on walls and woodwork or to warn the general public or public health authorities of the dangers inherent in the product. In fact, it did the opposite: it engaged in an energetic promotion of lead paint for both exterior and interior uses from the 1920s through the Second World War. For a portion of that period, white lead in paint was "the most important outlet for pig lead metal,"[30] according to the LIA, which was organized in 1928 to promote the use of lead.[31] A can of pure white lead paint was composed of huge amounts of lead, creating a large market for mining companies and pigment manufacturers.[32]

Within 6 months of the LIA's founding, its secretary, Felix Wormser, noted, "Of late the lead industries have been receiving much undesirable publicity regarding lead poisoning."[33] A year later, the *United States Daily*, a newspaper "Presenting the Official News

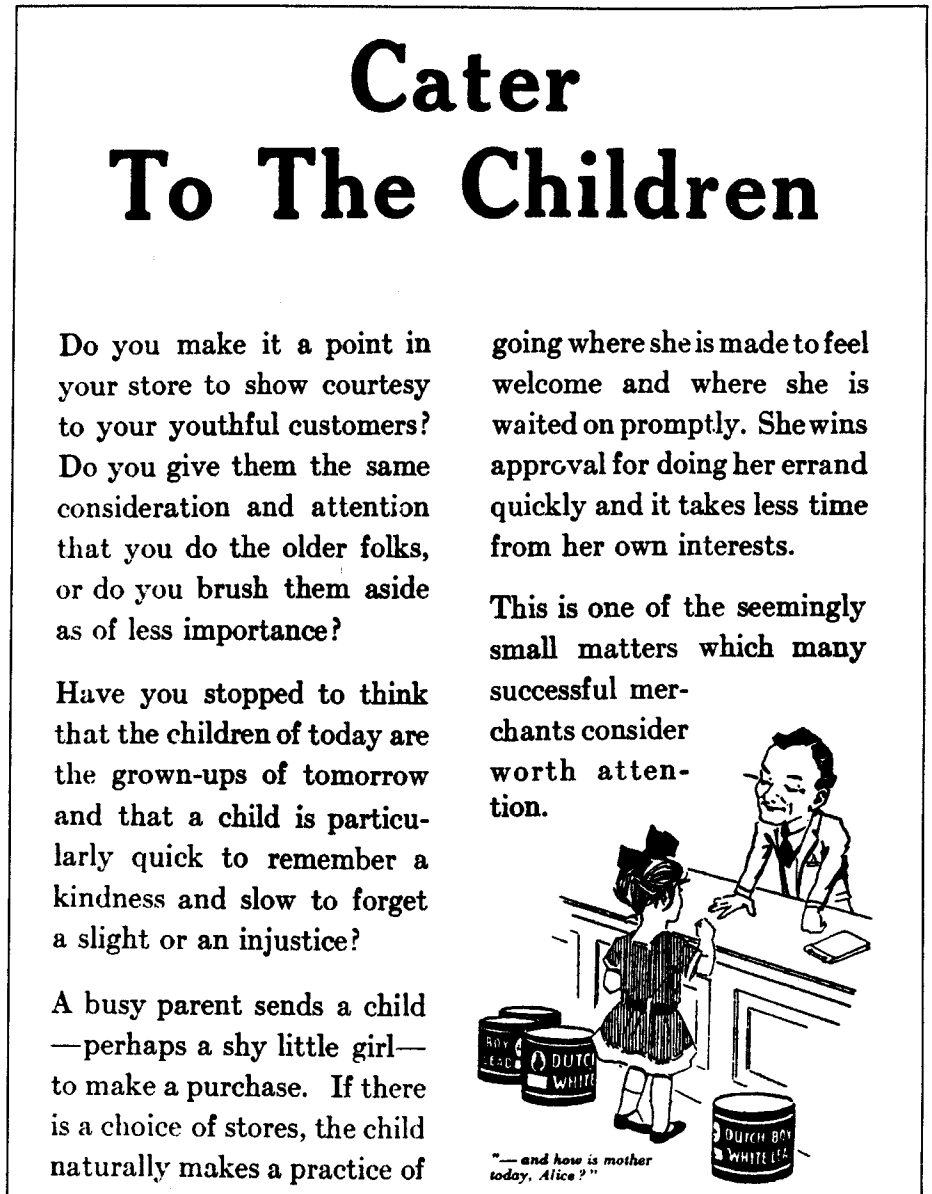
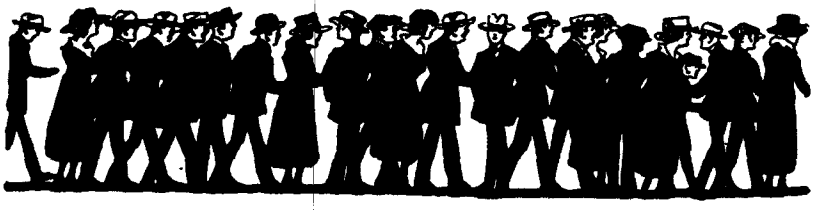


FIGURE 1—"Cater to the Children." From 1907, when the Dutch Boy logo was adopted by the National Lead Company, children were a central element in the company's advertising campaigns.

Do Not Forget the Children—
Some Day They May Be Customers

We are not even overlooking the children in our campaign for a record paint business this fall. The children's paint book, which is reproduced in only two colors above, carries a paint message to the grown-ups, while its jingles and "pictures" amuse the little ones. Moreover, in the back of the book there is a special paint message to the parents.

By all means do not hand out these children's paint books at random. One way is to hand a copy to each youngster who comes into your store *with a parent*. Parents appreciate little attentions of this sort paid their children. They like to trade at stores where the youngster is not overlooked. Another effective method is to mail the paint books to the children of prospective customers. Accompany the book with a pleasant little personal letter, working in subtly a few references to your store and the "Save the Surface" idea. There are other ways to distribute these clever little books, which you no doubt will work out to your advantage. Order a supply of these children's paint books today.



Source. Dutch Boy Painter (August 1920): 126.

FIGURE 2—"Painting the House That Jack Built." The Dutch boy, carrying a bucket of white lead, reminds retailers to court customers through their children by offering children's "paint books."

of the Legislative, Executive and Judicial Branches of the Federal Government," ran a front-page story on lead poisoning and children: "Lead poisoning as a result of chewing paint from toys, cradles and woodwork is now regarded as a more frequent occurrence among children than formerly."[34]

The reaction of the lead industry to growing negative publicity was to assure the public as well as the public health community that such fears were unfounded and that there was no reason to suspect that toys were being painted with lead pigments. In 1933, Charles F. McKahnn and Edward C. Vogt, pediatricians at Harvard Medical School and Boston's Infants' and Children's Hospitals, published an article in the *Journal of the American Medical Association* in which they mentioned a personal communication from Felix Wormser that led them to believe that "the lead industry and the manufacturers of cribs and toys . . . have cooperated by substituting other types of pigments for the lead pigments formerly used."[35(p1131)] Two years later, a major toy company acknowledged that it had been assured that its toys were safe but had found that the toys had been painted with lead. On investigation, the company found that the paint manufacturers were "willing to sign an agreement that the paint furnished would be non-poisonous, but only a few agreed that they would furnish materials that were entirely free of lead."[36] Another company responded to an inquiry from the Children's Bureau by informing the bureau that "we found that lead in the form of Lead Chromate was being used extensively in colored finishes [of toys]."[37]

Throughout the 1930s and 1940s, continuing reports of poisoned children and workers caused heightened concern among the lead pigment manufacturers, despite the LIA's assurances to the public health community. At the annual meeting of LIA members in June 1935, Wormser noted, "Hardly a day goes by but what this subject receives some attention at the headquarters of the Association." The threat of negative publicity about the health problems associated with lead was so serious that Wormser told the members, "[I]f all other reasons for the establishment of a cooperative organization in the lead industries were to disappear, the health problem alone would be sufficient warrant for its establishment."[38,39] The LIA responded to the undesirable publicity by seeking to rebut research findings and other news of lead's toxicity, whether to children or adults.

Sometimes even major corporations were intimidated. In the early 1930s, the Metropolitan Life Insurance Company had reported on the potential hazards to children from lead, and shortly thereafter Louis Dublin, the respected statistician at the Metropolitan, wrote to the US Children's Bureau requesting that because of the "strong remonstrance by the Lead Industries Association" about the publicity resulting from the earlier article, the Bureau refrain from mentioning "[t]he Metropolitan, either directly or by inference, in connection with whatever releases you may make." The Metropolitan official explained that "you will readily understand that we wish to avoid any controversy with the lead people."[40]

In 1939, the National Paint, Varnish and Lacquer Association (NPVLA), a trade group representing pigment and paint manufacturers, among others, privately acknowledged its "responsibility to the public and the protection of the industry itself with respect to the use of toxic materials in the industry's products."[41] In a letter marked "CONFIDENTIAL Not for Publication," the association informed its members that "the vital factor concerning toxic materials is to intelligently safeguard the public." The letter said that manufacturers should apply "every precautionary measure in manufacturing, in selling and in use where

toxic materials are likely to or do enter a product" and noted that "children's toys, equipment, furniture, etc. are not the only consideration." It warned NPVLA members that toxic materials "may enter the body through the lungs . . . through the skin, or through the mouth or stomach." The letter specifically pointed out that lead compounds such as white lead, red lead, litharge, and lead chromate "may be considered as toxic if they find their way into the stomach."

The NPVLA reproduced for its members a set of legal principles established by the Manufacturing Chemists' Association regarding the labeling of dangerous products. The first principle was "A manufacturer who puts out a dangerous article or substance without accompanying it with a warning as to its dangerous properties is ordinarily liable for any damage which results from such failure to warn." Even when a product was widely understood to be dangerous, the Manufacturing Chemists' Association suggested that warnings be included. Further, the legal principles stated, "The manufacturer must know the qualities of his product and cannot escape liability on the ground that he did not know it to be dangerous." The NPVLA letter concluded by calling on NPVLA members to make a "sincere effort in taking advantage of every possible precaution in the use of toxic materials in manufacturing, selling and in use."[42]

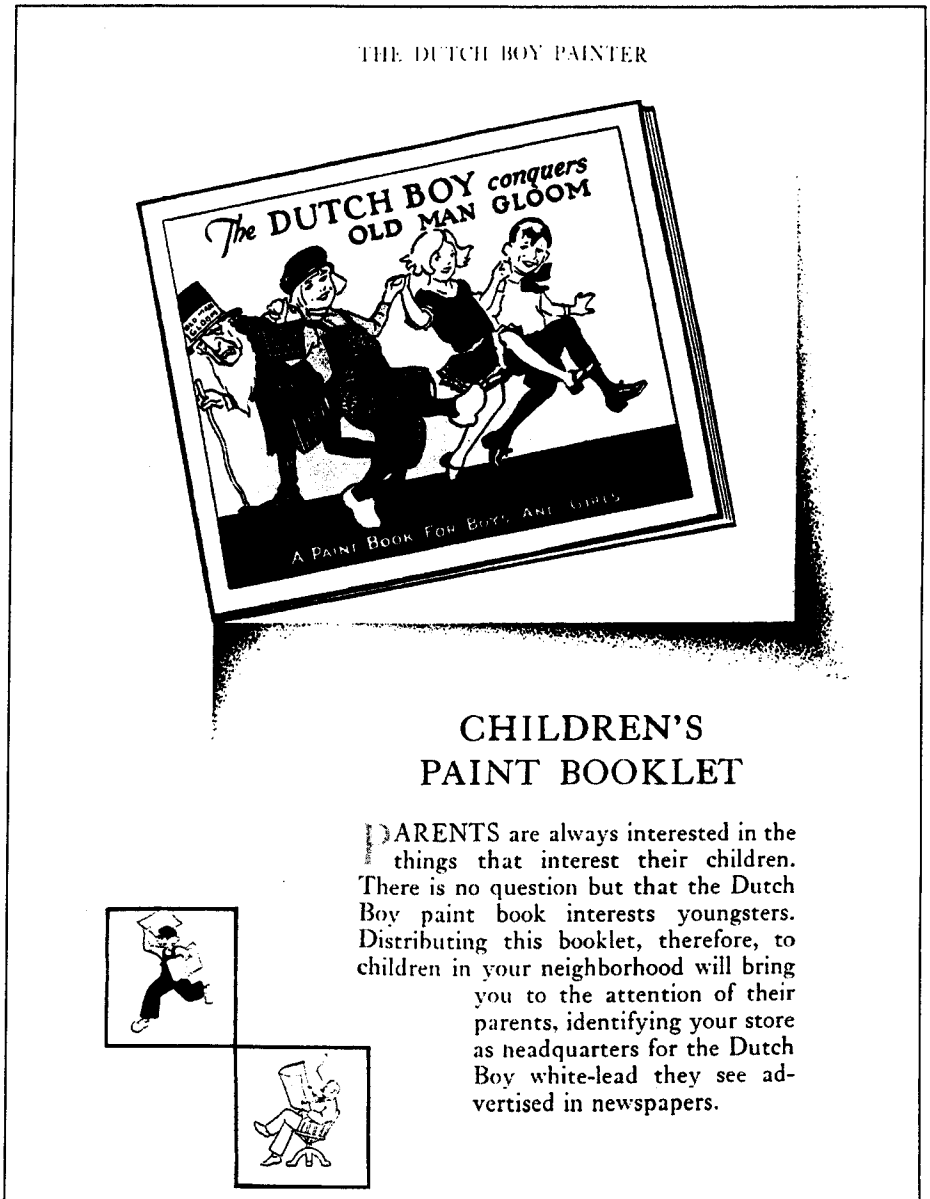
Do Not Forget the Children

The lead pigment manufacturers did not act on the NPVLA's advice. Rather, they actively sought to promote the use of lead in general and the safety of lead for interior uses in particular. Sherwin-Williams' logo was a can of paint poured over the entire globe, with the slogan "Covers the Earth." The Dutch Boy logo of National Lead Company paints was a familiar symbol in the first half of the 20th century and was an essential part of the company's marketing strategy for white lead. In addition to appealing to master painters, homeowners, wives, and mothers, National Lead sought to influence generations of owners by marketing directly to children. In fact, children were a prime target of the company's advertising campaign from early on, even before the LIA was founded. In a promotion to paint distributors, the company advised store owners, "Do Not Forget the Children."[43] In the 1920s, National Lead produced "A Paint Book for Girls and Boys" titled *The Dutch Boy's Lead Party*. Its cover showed the Dutch Boy, bucket and brush in hand, looking at lead soldiers, light bulbs, shoe soles, and other members of the "lead family."[44] The Dutch Boy also promoted the use of lead paint in schoolrooms, suggesting that summer was the best time to "get after the school trustees to have each room repainted" with "flat paint made of Dutch Boy white-lead and flatting oil."[45]

By the late 1920s and into the Depression, as information about lead paint's danger to children continued to accumulate—and after the LIA had acknowledged the inappropriateness of using lead paint on children's toys and furniture—the National Lead Company used the Dutch Boy to promote the use of lead in children's rooms. In one of its several paint books for children, National Lead suggested that its paint "conquers Old Man Gloom":

> The girl and boy felt very blue
> Their toys were old and shabby too,
> They couldn't play in such a place,
> The room was really a disgrace.
> . . . . . .
> This famous Dutch Boy Lead of mine
> Can make this playroom fairly shine
> Let's start our painting right away
> You'll find the work is only play.

The booklet shows the Dutch Boy mixing white lead with colors and painting walls and furniture.[46]



Source. Dutch Boy Painter (January/February 1929): 20.

FIGURE 3—"Dutch Boy Conquers Old Man Gloom." The advertised booklet shows how paint can be used on toys and in children's rooms to lift children's moods.

Source. Dutch Boy Painter (August 1927): 117.

FIGURE 4—"Finger Prints." This ad, one of several suggested to paint dealers, conveys to parents that white lead on interior walls is not only easy to clean but sanitary for young children.

To emphasize the benign qualities of lead paint, a National Lead Company's advertisement depicted a child in a bathtub scrubbing himself with a brush. His Dutch Boy cap, clothes, and shoes were slung on a chair, and a can of Dutch Boy All-Purpose Soft Paste and paintbrush sat on the floor next to him. The caption read, "Takes a Scrubbing with a Smile."[47] Another promotion showed a crawling infant touching a painted wall. The caption proclaimed, "There is no cause for worry when fingerprint smudges or dirt spots appear on a wall painted with Dutch Boy white-lead."[48] The explicit message was that it was easy to clean the wall; the implicit message was that it was safe for toddlers to touch woodwork and walls covered with lead paint. The theme of children painting appeared in numerous advertisements and articles.[49,50(p77)]

Even in 1949, National Lead remained particularly proud of its marketing campaign directed at children.

> Thousands of homes and offices still have souvenir figures [of the Dutch Boy Painter] in the form of paper weights, statuettes, etc. The appeal was particularly strong to children and the company has never overlooked the opportunity to plant the trademark image in young and receptive minds. One of the most successful promotions for many years was a child's paint book containing paper chips of paint from which the pictures (including, of course, several Dutch Boys) could be colored . . . . The company still will loan a Dutch Boy costume—cap, wig, shirt, overalls and wooden shoes—to any person who writes in and asks for it for any reasonable purpose, and the little painter has graced thousands of parades and masquerades.[51]

This marketing of the Dutch Boy image was seen as an essential element of National Lead Company's increasing profitability; the company's sales rose from $80 million in 1939 to more than $320 million in 1948. The continuing use of the Dutch Boy image was understood by the broader marketing industry as a clever method of improving the image of National Lead. In 1949, one marketing journal noted that "putting the boy, with his wooden keg and brush, in the attitude of a house painter, gave animation to the subject, tied him up with the product and suggested that the quality of the paint was so good that even a child could use it."[52]

In addition to portraying children in its advertisements, the pigment industry emphasized lead paint's "healthful" qualities. As early as 1923, National Lead advertisements in *National Geographic Magazine* promoted the idea that "lead helps to guard your health."[53] Throughout the 1920s, National Lead advertisements in *The Modern Hospital* called the company's tinted paint "the doctor's assistant" because of its cheerful color and the fact that it could be washed with soap and water. The ads assured readers that walls covered with National Lead paint "do not chip, peel or scale."[54] In 1930 the ads suggested, "Every room in a modern hospital deserves a Dutch Boy quality painting job."[55]

In the early 1930s the LIA produced a book, *Useful Information About Lead,* that suggested that the "prospective paint user" would be well advised to use paints containing a high percentage of lead, "the higher the better." A section called "White Lead in Paint" stated that "well painted buildings, both inside and out, go hand in hand with improved sanitation." The book included no warnings about the dangers of lead, despite the fact that the book was produced "to disseminate accurate information regarding lead products and how they best may be used." It included pictures of home and hotel interiors with captions such as "White lead paint is widely used for home interiors."[56] The theme of safety continued to be