1

Is Your Art Killing You?

Vinyl chloride, asbestos, benzene, lead, cigarettes, and now art and craft materials? Every day we find that more and more of the chemicals we eat, drink, breathe, work with, or are exposed to in some other way are hazardous. This is the era of chemistry. It is estimated that we are exposed to over 20,000 known toxic chemicals, and of the 500 new chemicals that are introduced into the marketplace every year, most have never been tested for their long-term effects on the human body.

Many artists and craftspeople are surprised to discover that a large number of these same hazardous chemicals are also present in art and craft materials. Most of us have thought of art materials as innocuous, an attitude stemming from the common use of art materials when we were children. Our parents assumed that if something was on the market, it was safe. Thus we were encouraged to express our creativity by really "getting into" our paints and modeling clay and experimenting with them. Only in recent years did we begin to find out that some of the art materials used by children are not as safe as assumed.

The attitude that art materials are safe has carried over into more professional art practices. In fact, many art teachers have perpetuated this attitude by

comments such as, "To be a potter, you have to live and breathe clay," and "You will get used to the smell," and "You have to get close to your materials." As a result, some very dangerous work habits developed, including pointing your paintbrush with your lips, eating while you worked, and ignoring the layers of clay and glaze dust covering everything in the studio. Of course, the problem was that most art teachers did not know that art materials could be toxic.

A LOOK BACKWARD

The history of arts and crafts includes terms such as potter's rot, painter's colic, and stonemason's disease, terms that clearly indicate that there was some awareness of hazards in the past. Probably the earliest recognition of the hazards of various arts and crafts was by Bernardini Ramazzini, acknowledged as the father of occupational medicine, in his book *De Morbis Artificum* (*Diseases of Workers*), published in 1713. He described the diseases of many occupational groups, especially craftsmen. The following sections contain quotations from some of his descriptions.

Painters

"I have observed that nearly all the painters who I know, both in this and other cities, are sickly; and if one reads the lives of painters it will be seen that they are by no means long-lived, especially those who were most distinguished. . . . For their liability to disease there is a more immediate cause, I mean the materials of the colors they handle and smell constantly, such as red lead, cinnabar, white lead, varnish, nut-oil and linseed oil which they use for mixing colors; and the numerous pigments made of various mineral substances."

Stonecutters

"We must not underestimate the maladies that attack stonecutters, sculptors, quarrymen and other such workers . . . Diemerbroeck gives an interesting account of several stonecutters who died of asthma; when he dissected their cadavers he found, he says, piles of sand in the lungs, so much of it that in cutting with his knife through the pulmonary vesicles he felt as though he were cutting a body of sand."

Coppersmiths

"In every city, e.g. at Venice, these workers are all congregated in one quarter and are engaged all day in hammering copper to make it ductile so that with it they may manufacture vessels of various kinds. From this quarter there rises such a ter-

rible din that only these workers have shops and homes there; all others flee from that highly disagreeable locality . . . . To begin with, the ears are injured by that perpetual din, and in fact the whole head, inevitably, so that workers of this class become hard of hearing, and, if they grow old at this work, completely deaf."

Potters

"What city or town is there in which men do not follow the potter's craft, the oldest of all the arts? Now when they need roasted or calcined lead for glazing their pots, they grind the lead in marble vessels, and in order to do this they hang a wooden pole from the roof, fasten a square stone to its end, and then turn it round and round. During this process or again when they use tongs to daub the pots with molten lead before putting them into the furnace, their mouths, nostrils, and the whole body take in the lead poison that has been melted and dissolved in water; hence they are soon attacked by grievous maladies."

A CONTEMPORARY LOOK

In recent times physicians have speculated that some of the illnesses of famous artists might have been the result of poisoning by their materials. For example, Dr. Bertram Carnow has suggested that Van Gogh's insanity might have been caused by lead poisoning and has theorized that the blurring of stars and the halos around lights in Van Gogh's later painting might have been the result of swelling of the optic nerve, a possible effect of lead poisoning. There is documentation of instances of Van Gogh swallowing paint and of his very sloppy painting technique. He was known to use the lead-containing Naples yellow as well as several other highly toxic pigments. Similarly, Dr. William Niederland has suggested that Goya's mysterious illness in his middle age might have been lead poisoning and not schizophrenia or syphilis as is commonly suggested. Goya had been known to use large amounts of lead white.

It would be nice to be able to say that these art hazards are in the past. However, the same diseases described by Ramazzini can be found among artists and craftspeople today. Although many artists are aware of certain art-specific hazards—for example, lead in flake white or lead white oil paint, or in pottery glazes—this awareness often does not extend to a consideration of the hazards of other materials. There are also many more materials being used today than in Ramazzini's time.

Many of the twenty-first-century materials used by artists—such as the plastics, lacquers, solvents, aerosol sprays, and dyes—can be highly toxic, as some modern artists have found out to their sorrow.

In fact, artists are developing many of the same occupational diseases as are found in industry. Of course this should not be entirely surprising, since artists

use many industrial chemicals, often in their homes, and without knowledge of the hazards and how to work safely.

Table 1-1 lists the hazards of many of the common art techniques. As you can see, hazards are found in all different types of art media. And we find artists developing occupational diseases in all different types of media. Examples include bladder cancer in painters; lead poisoning in stained-glass artists, potters, and enamelists; peripheral nerve damage in commercial artists; emphysema in acid etchers; aplastic anemia and leukemia from use of benzene; severe asthma among users of fiber-reactive dyes; cyanide poisoning from electroplating and kidney damage in jewelers from cadmium silver solders; brain damage in silkscreen printers; death of a weaver from anthrax; and metal fume fever in welders.

The only epidemiological study of artists was conducted by the National Cancer Institute in the early 1980s. This study, a proportionate mortality study, consisted of obtaining death certificates on artists and statistically analyzing the causes of deaths of the artists compared to the general population. Lists of deceased artists were obtained from obituaries published in *Who's Who in American Art* between 1940 and 1969. The study of 1,746 white, professional artists found that deaths from arteriosclerotic heart disease and from all cancer sites combined were significantly elevated for painters and, to a lesser degree, for other artists. For male painters, leukemia and cancers of the bladder, kidney, and colorectum were significantly elevated. A case control study of bladder cancer patients, in which the researchers compared the professions of bladder cancer patients to the professions of non-bladder cancer patients, found an overall relative risk estimate of 2.5 for artistic painters, confirming a twofold excess of bladder cancer deaths in the earlier study. The case control study also found that the risk increased with increasing length of employment as an artistic painter.

In other male artists, proportionate mortality ratios for bladder cancer and leukemia were not significantly elevated, but those for colorectal and kidney cancer were. A preliminary report found that among other male artists, colon cancer and prostate cancer were significantly elevated among sculptors.

Early Warning Attempts

The first warning to the arts community that some of these new—and many old—art materials might be toxic came from Robert Mallary, one of the pioneers in the field of art hazards, in an article in *Art News* in 1963. He described how, after working for about 15 years with polyester resins, epoxy resins, other plastics, spray paints, and a variety of solvents, he developed repeated episodes of a flulike illness. Eventually this was diagnosed by a toxicologist as liver and kidney damage caused by exposure to solvents and plastic resins. In the article, Mallary also described several other cases of illnesses caused by exposure to art materials.

In 1968, Dr. Jerome Siedlicki published an article on hazards in painting and sculpture in the *Journal of the American Medical Association*, which was later published as *The Silent Enemy* by Artists Equity Association in Washington, D.C.

In the mid-1970s, two independent centers for information on art hazards arose, in New York and Chicago. In New York, I had become interested in the problem and began writing a series of articles for *Art Workers News*, a publication of the now collapsed Foundation for Community of Artists (FCA). At the same time, I established the Art Hazards Resource Center at FCA to answer artists' inquiries on art hazards. By 1977, the interest in this area was large enough to form a separate organization, the Center for Occupational Hazards (later called the Center for Safety in the Arts), as a national clearinghouse for research and education on art hazards. Monona Rossol and Catherine Jenkins, both chemists and artists, were cofounders.

At the same time, Dr. Bertram Carnow, an occupational health physician, and Gail Barazani, an artist, also began writing about art hazards in Chicago. Gail Barazani formed the organization Hazards in the Arts, which did organizing around this issue in the Chicago area for several years. In Vermont, Dr. Julian Waller and Larry Whitehead wrote articles and did presentations on art hazards in the late 1970s.

Challenging Myths about Artists

In the past, many myths have developed concerning the mental instability, the suffering, and the antisocial behavior of artists. These myths have interfered with the realization that the hazards artists face are real and that some of their unusual behavior may be traced to the fact that the materials they have used over a long period of time might have made them ill or might have produced bizarre psychological effects. For example, almost everyone has heard the phrase "mad as a hatter," or has heard of Lewis Carroll's Mad Hatter in *Alice in Wonderland.* This stereotype has some basis in fact, since hatters used mercuric nitrate to felt hats at the time the book was written, and mercury poisoning does cause severe psychological symptoms.

The myth of the artist as a Sunday painter has also prevented those outside the artistic community from realizing the dangers artists face. For example, when I first started investigating the health hazards of art materials, I had trouble convincing government officials and many doctors that there was a problem. First, they found it hard to believe that artists were working with hazardous materials, and, second, they pictured artists as being exposed to these hazards only occasionally and therefore not being at great risk. It took time to convince them that most artists put in regular hours every day and, in fact, often work very long hours at their art.

WHAT IS THE PROBLEM?

Why are artists getting ill from their art materials? Why don't artists know more about the hazards and how to work safely? This section discusses the major reasons for what is a true public health problem.

Too Toxic

Many chemicals found in art materials just shouldn't be there because they are too dangerous to use without prohibitively expensive precautions, or because serious illness or death can easily occur from small exposures or accidents. Cancer-causing chemicals such as asbestos, benzene (formerly found in many paint strippers), chromates and dichromates, and cadmium in some silver solders are one such category of chemicals that should not be in art materials. Since there is no known safe level of exposure to carcinogens, zero exposure is the ideal. That is very difficult and expensive to do.

Many highly toxic chemicals also should not be used in art materials because of the serious nature of their health effects. For example, there have been many cases of hydrogen cyanide poisoning, and even fatalities, from the use of cyanide electroplating solutions and cyanide cleaning solutions. I do not think artists can work safely with cyanide solutions. Other highly toxic chemicals that should not be found in art materials include lead, arsenic, n-hexane (formerly found in rubber cement, for example), and mercury and its compounds.

Why are these chemicals there? There are two reasons. First, in the past there has not been much incentive for art material manufacturers to develop safer products. The passage of the Labeling of Hazardous Art Materials Act of 1988 by the U.S. Congress gave manufacturers incentives to develop safer products as an alternative to warning users about the risk of cancer, birth defects, brain damage, and the like. The development of lead-free pottery glazes and enamels is a good example of safer products that have become available.

A second reason is that many artists are using materials that have been developed for industry and not artists. Many of these materials need very expensive ventilation systems and careful training to be used safely. Examples include cyanide gold and silver electroplating solutions, plastic resins (e.g., polyester resin, polyurethane foam resin), and solvent-based silk-screen printing inks. Artists should be very cautious about using such industrial materials unless they are willing to spend the money to do it safely.

Inadequate Labeling

Prior to the 1980s, most art materials were inadequately labeled. The only required labeling was for acute hazards resulting from a single exposure. However, most artists have repeated exposure to art materials. The lack of proper

warnings meant that most artists did not know if they were working with hazardous art materials, or how to work safely with them. The question of proper labeling of art materials is discussed in Chapter 2.

Failure of the Schools and Colleges

Artists should learn about the hazards of art materials and how to work safely with them when they first begin to use them. This should start as early as day care and elementary schools, but becomes most important in secondary schools and colleges. Unfortunately, in the past, most art teachers themselves did not know about the hazards of art materials, and therefore couldn't teach it. In addition, most schools did not have health and safety programs or adequate precautions such as ventilation. Over the last couple of decades, this began to change as groups like the Center for Safety in the Arts offered educational programs on art hazards to teachers and students and provided consultative services to schools and colleges. Organizations such as the College Art Association offered lectures at their conferences, and the National Association for Schools of Art and Design, which certifies college art programs, made safety a requirement for certification and recertification.

Improper Diagnosis

Since artists often don't know about the hazards of their art materials and therefore don't take adequate precautions, they sometimes become ill from exposure to these art materials. Unfortunately, most physicians are not trained in the toxic effects of chemicals. As a result they are often unable to properly diagnose an art-related illness. I have seen, for example, lead poisoning diagnosed as psychosomatic. Instead we have to refer artists with illnesses suspected of being caused by art materials to physicians specializing in occupational medicine. Fortunately, several dozen occupational health clinics exist around the country, and we can refer artists to them.

Table 1-1. *Hazards of Art Techniques*

TECHNIQUE	MATERIAL/PROCESS	HAZARD
Airbrush	pigments	lead, cadmium, manganese, cobalt, mercury, etc.
	solvents	mineral spirits, turpentine
Batik	wax	fire, wax fumes
	dyeing	dyes
Ceramics	clay dust	silica
	glazes	silica, lead, cadmium, other toxic metals

Ceramics	slip casting	talc, asbestiform materials
	kiln firing	sulfur dioxide, carbon monoxide, fluorides, infrared radiation, etc.
Commercial art	rubber cement	n-hexane, fire
	permanent markers	xylene, propyl alcohol
	spray adhesives	n-hexane, 1,1,1-trichloroethane, fire
	airbrushing	see Airbrush
	typography	see Photography
	photostats, proofs	alkali, propyl alcohol
Computer art	ergonomics	carpal tunnel syndrome, poorly designed workstations
	video display	glare, extremely low frequency (ELF) radiation
Drawing	spray fixatives	n-hexane, other solvents
Electroplating	gold, silver	cyanide salts, hydrogen cyanide
	other metals	acids
Enameling	enamels	lead, cadmium, arsenic, cobalt, etc.
	kiln firing	infrared radiation
Forging	hammering	noise
	hot forge	carbon monoxide, infrared radiation
Glassblowing	batch process	lead, silica, arsenic, etc.
	furnaces	heat, infrared radiation
	coloring	metal fumes
	etching	hydrofluoric acid, fluoride salts
	sandblasting	silica
Holography	lasers	nonionizing radiation, electrical
	developing	bromine, pyrogallol, see also Photography
Intaglio	acid etching	hydrochloric and nitric acids, potassium chlorate, nitrogen dioxide, chlorine gas
	solvents	alcohol, mineral spirits, kerosene
	pigments	lead, cadmium, manganese compounds, etc.
	aquatint	rosin dust, dust explosion
	photoetching	methyl alcohol, acrylates, sodium carbonate
Jewelry	silver soldering	cadmium fumes, fluoride fluxes
	pickling baths	acids, sulfur oxides
Lithography	solvents	mineral spirits, isophorone, cyclohexanone, kerosene, methylene chloride, etc.
	acids	nitric, phosphoric, hydrofluoric, hydrochloric, etc.
	pigments	lead, cadmium, manganese compounds, etc.

Lithography	talc	asbestiform materials
	photolithography	dichromates, solvents
Lost wax casting	investment	cristobalite (silica)
	wax burnout	wax fumes, carbon monoxide
	crucible furnace	carbon monoxide, metal fumes
	metal pouring	metal fumes, infrared radiation, molten metal
	sandblasting	silica
Painting	pigments	lead, cadmium, mercury, cobalt, manganese compounds, etc.
	oil, alkyd	mineral spirits, turpentine
	acrylic	trace amounts ammonia, formaldehyde
Pastels	pigment dusts	lead, cadmium, mercury compounds
Photography	developing bath	hydroquinone, monomethyl-p-aminophenol sulfate, alkalis
	stop bath	acetic acid
	fixing bath	sulfur dioxide
	intensifier	dichromates, hydrochloric acid
	toning	selenium compounds, hydrogen sulfide, uranium nitrate, sulfur dioxide, gold salts
	color processes	formaldehyde, solvents, color developers
	platinum printing	platinum salts, lead, acids, oxalates,
Printmaking	see Intaglio, Lithography, Relief printing, Screen printing	
Relief printing	solvents	mineral spirits
	pigments	lead, cadmium, manganese compounds, etc.
Screen printing	pigments	lead, cadmium, manganese compounds, etc.
	solvents	mineral spirits, toluene, xylene
	photoemulsions	ammonium dichromate, chlorine bleach
Sculpture, clay	see Ceramics	
Sculpture, laser	lasers	nonionizing radiation, electrical
Sculpture, neon	neon tubes	mercury, electrical
Sculpture, plastics	epoxy resin	amines, diglycidyl ethers
	polyester resin	styrene, methyl methacrylate, methyl ethyl ketone peroxide
	polyurethane resins	isocyanates, organotin compounds, amines, mineral spirits
	acrylic resins	methyl methacrylate, benzoyl peroxide
	plastic fabrication	decomposition products (carbon monoxide, hydrogen chloride, hydrogen cyanide, etc.)
Sculpture, stone	marble	nuisance dust
	soapstone	silica, talc, asbestiform materials

Sculpture, stone	granite, sandstone	silica
	pneumatic tools	vibration, noise
Stained glass	lead came	lead
	soldering	lead, zinc chloride fumes
Weaving	loom	ergonomic problems
	dyeing	dyes, acids, dichromates
Welding	oxyacetylene	carbon monoxide
	arc	ozone, nitrogen dioxide, ultraviolet and infrared radiation, electrical
	metal fumes	copper, zinc, lead, nickel, etc.
Woodworking	machining	wood dust, noise, fire
	glues	formaldehyde, epoxy
	paint strippers	methylene chloride, toluene, methyl alcohol, etc.
	paints, finishes	mineral spirits, toluene, turpentine, ethyl alcohol, etc.
	preservatives	chromated copper arsenate pentachlorophenol, creosote

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2

Who Protects Artists?

Having seen that artists can become ill from exposure to hazardous art materials, you should be asking yourself, "How do I get help and more information?" Of course this book is one source of information. But it isn't enough. How do you know whether a particular brand of art material is dangerous? Who do you turn to for help? This chapter tries to answer these questions.

THE LABELING ISSUE

The first thing you see on an art material is usually a label. Any warnings on the label should be your first alert as to whether the material is hazardous or not. At least this is true if the art material is properly labeled, as required under the Labeling of Hazardous Art Materials Act of 1988. This law applies only to the United States. I discuss Canadian laws later.

The campaign to obtain adequate warning labels on art materials started in the late 1970s, as an adjunct to education about art hazards. At that time,