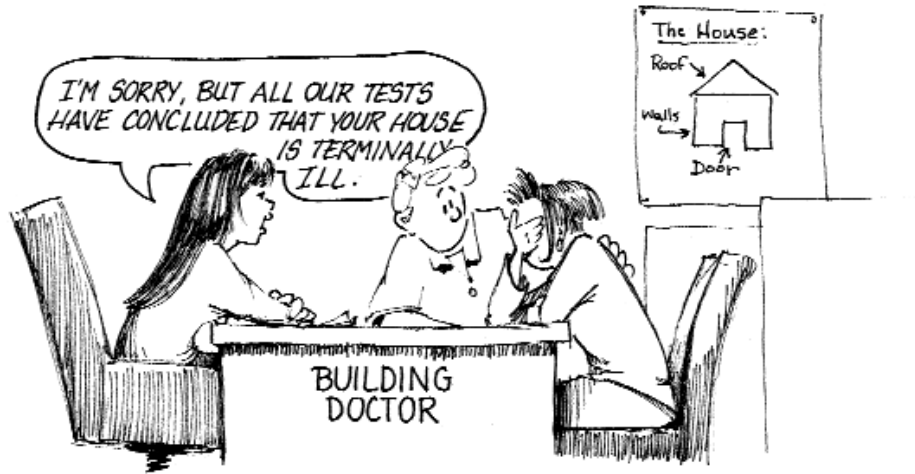




Part One

The Building of a House

The Basics



So how exactly does your home affect your health? There are two main ways. The first is the building itself and the second is how you, the occupants, live in and maintain your homes. Through the course of this book, we will examine both.

But before we get started let's discuss some of the basic concepts that I will refer to throughout the book.

Environmental Health

For the sake of simplicity, the total environment can be divided into two connected but separate fields, the inside and the outside. We are all familiar with the larger, outside environment and its corresponding health concerns such as global warming, emissions from coal burning industries, the use of pesticides on food, polluted water sources, and the detrimental effects of diesel exhaust fumes. However, there is also a smaller, more personal environment that affects our health dramatically. This is the inside environment found within our own homes.

In this book we will be paying particular attention to children's environmental health at home. But do remember, what affects our children's health also affects us. While the

"The test of the morality of a society is what it does for its children."

— Dietrich Bonhoeffer

CHILDREN'S HEALTH IN AMERICA

1. Asthma, afflicting nearly 4.8 million US children, is the primary cause of absenteeism and hospital admission among chronic conditions (American Lung Association 1999)
2. Cancer is the number one disease-related cause of death in children (National Cancer Institute, 1998). Approximately 8,500 US children – newborns to age 15 – are diagnosed with cancer annually.

The most recent cancer statistics on children from the National Cancer Institute (1998) show that the percentage of cancer increased in children 0 – 4 years old between 1973 and 1995:

- 53% rise in brain and other nervous system cancers
- 37% rise in soft tissue cancer
- 32% rise in kidney and renal pelvis cancers
- 18% rise in acute lymphoid leukemia

They reveal increased cancer in teenagers ages 15 - 19 during the same period:

- 128% rise in non-Hodgkin's lymphoma
- 78% rise in ovarian cancer
- 65% rise in testicular cancer
- 30% rise in bone and joint cancer
- 29% rise in thyroid cancer

3. Childhood learning disabilities, hyperactive behavior, and inability to maintain attention have also soared nationwide. The number of children in special education programs increased 191% from 1977 – 1994 (Greater Boston Physicians for Social Responsibility, 2000)
4. Autism appears to be skyrocketing. In California, childhood autism is thought to have risen over 200% between 1987 and 1998 (California Health and Human Services Agency, 1999)

Courtesy of Center for Health, Environment and Justice¹

government and industries continue their convoluted quest to establish safe levels of toxic chemicals and pollutants in our everyday environment, ultimately we are the ones responsible for raising our children and safeguarding their health. We must become our own Environmental Protection Agency and take back our decision-making power. At the very least, we can control what we are exposed to within our own homes.

Let's look more closely at some current children's health statistics and think this through (see sidebar "Children's Health in America").

These statistics speak for themselves, loud and clear! What does the future hold for these youngsters? Numerous scientists believe many of these diseases and learning problems may be related to children's exposure to environmental chemicals in the womb or in their everyday environment. Children's everyday environments include their homes, schools, daycare facilities, and their babysitters. Think about it. How much do you really know about these environments? How healthy are they?

It's important to study children's health for a variety of reasons:

- Concern for our children's well-being cuts through skepticism, doubt, blame, politics, and the moneyed interests of industry. Protecting our children's health should be the common platform on which we can all stand together.
- Young children represent the closest thing to a baseline or a control group in our society to which we can compare our own health. After all, they don't hold stressful jobs, smoke, or drink alcohol. Children do, however, receive greater doses of whatever chemicals are present in the air they breathe, the water they drink or bathe in, and the food they eat because, pound for pound, they breathe, drink, and eat more than adults do.

Looking closely at our children's health reveals what we all are being exposed to on a daily basis, namely massive amounts of low-level, chemical toxins on every front.

- Children have special vulnerabilities. Their growing bodies do not have fully developed musculature, skeletal, nervous, or immune systems. Therefore they cannot withstand the same exposures to chemicals and pollution as adults. Most safety levels for exposure to toxic chemicals have been set based on a 155 pound white male in the work place not a 20 pound toddler at home.
- If environmental toxins interfere with children's growth and development during critical time periods, this can lead to structural and functional losses that result in lifelong disabilities. In the future, if a large percentage of society has disabilities, what will be the resulting costs and who will pay for the necessary care? Also, the longer life expectancy of children carries the potential for accumulating higher levels of exposures and more time to develop delayed adverse health outcomes. We truly have no idea what our children's health will look like in the future or what devastating costs we may have passed along to them.

Our children are our greatest resource, so let's make sure we are at least protecting them at home.

The Barrel Effect and the Total Body Burden

So what exactly are safe levels of these toxic chemicals and pollution? Official levels vary depending on which country you live in. As a basic guideline I offer the following suggestion for us all to adopt: the only safe level is zero.

The only safe level is zero

It can be argued that some toxic substances occur in nature and are therefore natural, such as radon gas, so how can they be bad for us in our home? Well, nature has a much better system in place than we currently do in our homes. Radon levels outside your home are easily dissipated by the elements and therefore diluted. Radon in your basement or crawl space can accumulate over time in these tight spaces and concentrate to the dangerous levels associated with lung cancer and other health problems.

But what if you are only being exposed to “low-level” amounts of toxic chemicals in your home? Let me explain what's called the “barrel effect.” Picture if you will an empty rain barrel. This empty rain barrel represents your body, completely free of any toxic chemicals or substances. In daily life you are exposed to a rising tide of synthetic chemicals. If your body could metabolize all these chemicals into completely benign breakdown products and excrete them, they would pose less of a health hazard. But unfortunately your body, and especially children's bodies, are not equipped to cope with a daily onslaught of these chemicals in ever more complex combinations. Instead, many of these substances accumulate inside your body and your rain barrel begins to fill. As this process of filling continues, you may or may not start to get some messages (symptoms) from your body such as fatigue, headaches, or allergies. In addition to getting these symptoms, children may become hyperactive or have problems concentrating, complain



of “tummy aches”, get sleepy, or just behave “differently” and “not feel like themselves”. Does any of this sound familiar to you?

At this point many people respond by having an extra cup of coffee or a soda for an energy boost, or take a pill for their headache, allergies or concentration/behavior problem. This might bring some temporary relief but invariably these tactics only add more chemicals to the barrel. You see, we tend to operate with an “addition” mentality. If we don't feel well we usually

look to add something such as a pill instead of thinking with a “subtraction” mentality, which would look at what we could take away. Instead of taking a pill for a headache, we could open a window and let out the strong smell of someone's perfume.

This accumulation of toxins can also be called “increasing the total body burden” or the “toxic chemical load.” Eventually the barrel becomes full and this may be where more serious health problems such as asthma, crippling immune system problems, or even cancer start to show up. Your barrel may be quietly and invisibly filling for several years then — wham! Seemingly overnight your health, and often your life, somehow fall apart.

What we are describing here are chronic, low-level, daily exposures. But exposures can also be sudden and acute, such as a massive dose of pesticides received while spraying your own lawn without using personal protective gear. In either situation, many people become sensitized to specific chemicals or pollutants from these kinds of exposures and will experience symptoms whenever they are re-exposed to them.

Once set in motion, this process can lead to additional sensitivities to an ever-widening range of other, often dissimilar, chemicals that cause similar symptoms. This characteristic is known as the “spreading phenomenon” and this condition is called multiple chemical sensitivity (MCS). For example, headaches that were originally linked to formaldehyde exposure from new kitchen cabinets could progress to headaches that are triggered by fragranced products, progressing to headaches provoked by diesel exhaust fumes. Eventually, almost everything can seem to cause headaches. This can become a very serious and debilitating illness. Because symptoms can be so varied or so erratic, it can be hard to properly diagnose them, which unfortunately leads to a lot of misdiagnoses and therefore inappropriate care.

Rachel Carson in her book *Silent Spring* pointed out that the innumerable low-level exposures to which we are subjected day by day, year after year, are “like the constant dripping of water that in turn wears away the stone, this birth-to-death contact with dangerous chemicals may in the end prove disastrous. Lulled by the soft sell and the hidden persuader, the average citizen is seldom aware of the deadly materials with which he is surrounding himself; indeed he may not realize he is using them at all.”³ It continues to amaze me that Rachel Carson so eloquently identified a health problem

that has vastly increased in magnitude since she wrote these words in 1962.

The sad truth about today's children is that many of them are being born with barrels already dangerously full. How else can we explain the increase in childhood cancer in the 0-4 year age group? Previously, it has been thought that cancer develops over extended years of time: as much as 20-30 years. It would seem likely that the total body burden of the parents at the time of conception and the quality of their genes, combined with chemical exposures the mother receives while pregnant are critical factors in this outcome. As more and more synthetic chemicals and pollution are introduced into the environment, larger numbers of children and adults are likely becoming affected.

But how do you know how full your barrel is? There are now health professionals who specialize in what's called Environmental Medicine. They can give us a clear glimpse. The American Academy of Environmental Medicine (AAEM) and the American Academy of Pediatrics (AAP) can provide you with further information and referrals if you are interested to pursue this further (see Appendix C). When asking for a referral be sure to specify whether it is a child or an adult who needs help. Environmental hazards may pose different risks for children than for adults because children are not simply miniature adults. Environmental pediatricians are especially aware of this; they are experts at tailoring guidance and treatment to the unique, complex, and changing needs of each developing child. I wholeheartedly encourage you to let your intuition guide you in these matters. Sometimes we get in our own way with our feelings of intimidation, skepticism, doubt, and busy lifestyles and all the while keep ourselves from getting the help we really need.

Another good source of information if you are interested in doing a little self-diagnosis is: *Is This Your Child? Discovering and Treating Unrecognized Allergies in Children and Adults*, by Doris Rapp M.D. Dr. Rapp is also a member of the AAEM. This information is not difficult to understand. Always remember — you know more about your health or your child's health than anybody else because you experience it on a daily basis.

I would also like to clarify why I usually refer to “toxic chemicals” in conjunction with the general term “pollution”. This is because we need to recognize that there are other forms of pollution that can affect our health that are not chemical in origin.

In a study led by Mount Sinai School of Medicine in New York, in collaboration with the Environmental Working Group and Commonweal, researchers at two major laboratories found an average of 91 industrial compounds, pollutants, and other chemicals in the blood and urine of nine volunteers, with a total of 167 chemicals found in the group. Like most of us, the people tested do not work with chemicals on the job and do not live near an industrial facility.

Scientists refer to this contamination as a person's “body burden.” Of the 167 chemicals found, 76 cause cancer in humans or animals, 94 are toxic to the brain and nervous system, and 79 cause birth defects or abnormal development. The dangers of exposure to these chemicals in combination has never been studied.²

Electromagnetic radiation (EMR) from the multitude of electrical appliances we use is one such source of daily pollution with which we are all bombarded.

In the meantime, I believe that the precautionary principle offers us some important guidelines.

The Precautionary Principle

The definition of the Precautionary Principle is: “When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.”⁴ The precautionary principle means taking preventive action in the face of uncertainty. In order to do this we must shift the burden of proof from those who might be harmed to those who create the risks, and choose safer alternatives to potentially harmful activities or substances.

Instead of asking what level of harm is acceptable, a precautionary approach asks: How much contamination can be avoided? What are the alternatives to this product or activity, and are they safer? Is this activity even necessary? Taking a precautionary approach means not only considering risks, but looking for better options and solutions.

“Unless our governmental monitoring agencies begin to protect the people rather than big business, we and future generations are truly in jeopardy.”

— Doris Rapp, M.D.
Is This Your Child's World?

Remember what happened with lead and asbestos? First we were told these substances were safe and then later we were told they were hazardous. Actually, we've known about lead poisoning since the 1930s; we just didn't act on it. As our knowledge about the toxicity of chemicals increases, the “safe” thresholds of exposure have been continuously revised down. The safe level of exposure to the toxic chemical formaldehyde (which is found in high concentrations inside many newly constructed homes) was set by the American Conference of

Governmental Industrial Hygienists (ACGIH) at 10 parts per million (ppm) in 1946. By 1992 the safe level had dropped to 0.3 ppm, further qualified as a level not to be exceeded at any time.⁵ We must use our voices and our buying power and insist that government and industries alike adopt precautionary measures in their thinking. The only really safe amount of any toxic chemical is zero.

I believe we must now adopt the precautionary principle in the building of our homes too.

Bau-biologie (Building Biology)

The German term “Bau-biologie” (pronounced “bow” or “bough” -biology) translates into English as “Building Biology”. These terms can be used interchangeably, although I prefer to use the English translation, as it is easier for most people to pronounce. Building Biology is the science that studies how buildings affect our health, and the application of this knowledge in the design and construction of new buildings, renovations, or remediation (fixing sick buildings).

It began in post-war Germany when there was a great demand for reconstruction. Many new buildings were built quickly and cheaply. This had a devastating effect on the health of a large portion of the population and placed an enormous burden on their health care system. It was discovered that commonly used building materials and certain methods of construction were causing these problems. Today we call this sick building syndrome (SBS) and the resulting human health problems associated include multiple chemical sensitivity (MCS), environmentally triggered illness (ETI), asthma, and allergies, to name but a few.

In light of this, many Germans realized it was better, and ultimately much less expensive, to construct buildings in a healthy manner. As a result, the study of Bau-biologie began and was developed by people such as Anton Schneider, Ph.D., Hubert Palm, M.D., and Alfred Hornig. Over the years guidelines for healthy homes and workplaces were established to ensure the health of buildings. (See Appendix D.)

Although well known to architects and health professionals in Europe, this specialized science, or way of building and living, is still relatively unknown in the U.S.A. I believe it is a science whose time has come.

On average, we spend 90 percent of our time indoors. Shouldn't we make sure that the buildings that house us are built with health, nature, and good business practice in mind? Changing the way we build following Building Biology principles is an effective and sustainable way to positively impact the health and wellbeing of the greatest number of people. The following chapters describe how Building Biology works in our homes.

Now let's continue with the rest of the book. You may want to refer back to this chapter from time to time to remember these basic concepts.

“We shape our buildings and afterwards our buildings shape us.”

— Winston Churchill
