Life’s Delicate Balance
Causes and Prevention of Breast Cancer

Janette D. Sherman, M.D.
Life's Delicate Balance
# CONTENTS

<table>
<thead>
<tr>
<th>ACKNOWLEDGMENTS</th>
<th>vii</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>ix</td>
</tr>
<tr>
<td>1. ALL LIFE IS CONNECTED</td>
<td>1</td>
</tr>
<tr>
<td>Cancer in humans and wildlife</td>
<td></td>
</tr>
<tr>
<td>2. THE DELICATE BALANCE OF LIFE</td>
<td>6</td>
</tr>
<tr>
<td>How cancer grows</td>
<td></td>
</tr>
<tr>
<td>3. RISKS FOR BREAST CANCER</td>
<td>11</td>
</tr>
<tr>
<td>We all are at risk</td>
<td></td>
</tr>
<tr>
<td>4. BREAST CANCER DIAGNOSIS</td>
<td>30</td>
</tr>
<tr>
<td>Mammographic and other methods</td>
<td></td>
</tr>
<tr>
<td>5. RADIATION</td>
<td>42</td>
</tr>
<tr>
<td>From Bikini Island to Long Island</td>
<td></td>
</tr>
<tr>
<td>6. RADIATION</td>
<td>57</td>
</tr>
<tr>
<td>Nuclear and x-ray</td>
<td></td>
</tr>
<tr>
<td>7. HORMONES ONE</td>
<td>88</td>
</tr>
<tr>
<td>Human and animal pharmaceuticals</td>
<td></td>
</tr>
<tr>
<td>8. HORMONES TOO</td>
<td>109</td>
</tr>
<tr>
<td>False hormones</td>
<td></td>
</tr>
<tr>
<td>9. TAMOXIFEN</td>
<td>133</td>
</tr>
<tr>
<td>Chemical manipulation</td>
<td></td>
</tr>
<tr>
<td>10. POST-MENOPAUSAL HORMONE REPLACEMENT</td>
<td>155</td>
</tr>
<tr>
<td>Questions and risks</td>
<td></td>
</tr>
<tr>
<td>11. THE GENETIC CONNECTION</td>
<td>162</td>
</tr>
<tr>
<td>Biology and economic and social ramifications</td>
<td></td>
</tr>
<tr>
<td>12. THE BREAST CANCER EPIDEMIC ON LONG ISLAND</td>
<td>177</td>
</tr>
<tr>
<td>13. DISEASES IN MEN</td>
<td>190</td>
</tr>
<tr>
<td>Breast, prostate, and testicular cancer, and sperm abnormalities</td>
<td></td>
</tr>
<tr>
<td>14. QUESTIONS, HISTORY, ETHICS, AND MORALITY</td>
<td>203</td>
</tr>
<tr>
<td>The global marketplace</td>
<td></td>
</tr>
</tbody>
</table>
15. THE CANCER MOVEMENT
   Independent, sold-out, or bought-up?

216

16. WHAT THE CITIZEN CAN DO
   Personal choices and political actions

230

17. SOURCES OF INFORMATION AND ACTION
   Knowledge is power

238

INDEX

257
ACKNOWLEDGMENTS

There are many people to whom I am indebted for help in getting this book into print. Without their suggestions, criticism, and support, it would have been an even more difficult task. I have carefully considered each offering of information and criticism, and have tried to incorporate the many ideas and points of view into the book. I give thanks to all who have contributed to this effort, named and not named.

I give thanks to author and poet, Dr. Sandra Steingraber; to Dr. Lewis Walker, Chairman of the Department of Sociology at Western Michigan University, for reading the entire manuscript; and to Janet Collins, the prime organizer of the First World Conference on Breast Cancer; each of whom read the entire manuscript and provided valuable suggestions. I thank Marcia Marks, environmental activist, who read much of the manuscript and posed questions needing to be addressed.

I thank Dr. Ernest Sternglass, Dr. Jay Gould, Dr. Rosalie Bertell, and Dr. John Gofman, who gave of their time, provided fascinating and valuable information and suggestions, and critiqued portions of the radiation chapters.

I thank Dr. Michael Anbar for background material on thermography and for his critique of the chapter on mammography.

I appreciate the receipt of background materials, suggestions, and critique of individual chapters provided by Judy Brady, Helena Baldyga, Eve Clute, Janet Collins, Jane Gould, Karen McDonell, Hope Nemiroff, Dorothy Golden Rosenberg, Leonard Schroeter, Rose Marie Williams, Dr. Ruth Allen, Dr. Myron Mehlman, and Dr. Jay Nuckols, and encouragement from Dr. Jack Mongar.

I thank Judy Ochs, spirited, bright, and talented breast cancer thriver who provided the illuminating interviews that are included herein.

I give thanks to the dedicated environmental activists on Long Island, and especially to Mary Dowden, Elsa Ford, Miriam Goodman, and Mary Joan
Shea. I thank the activists from the Washington Toxics Coalition, the Rachel Carson Council, the First World Conference on Breast Cancer, and the brave and committed women I have met from the Virginia and Pennsylvania Breast Cancer Coalitions.

Lastly, my heartfelt thanks goes to my husband, Donald Nevinger, whose Smithsonian and internet research turned up fascinating background information, who read endless revisions, organized stacks of research materials, and was totally supportive when I had too many hours at the computer. I appreciate his thoughtfulness, encouragement, and support that has never wavered.
We shall require a substantially new manner of thinking if [human]kind is to survive.
—Albert Einstein

Twenty years ago, while serving on an advisory committee to the U.S. Environmental Protection Agency for the Toxic Substances Control Act, I was asked to write a short article on the issue of risks and benefits from exposure to chemicals. I called the paper “Cancer—Our Social Disease.” It seemed then, and it is clear now, that winning the so-called war on cancer will not be accomplished by physicians, scientists, pharmaceutical corporations, epidemiologists, geneticists, nor by the thousands employed in various governmental agencies and universities at home and abroad. It will be won by people who understand the connection between the loss of personal health and worldwide pollution from toxic chemicals, ionizing radiation, and endocrine-altering chemicals.

Anyone who doubts that prevention of cancer lies not in the realm of politics and economics need only read recent medical commentary attacking scientists who publish data linking chemicals and radiation to cancer. “Chemophobia, the unreasonable fear of chemicals, is a common public reaction to scientific and media reports suggesting that exposure to various environmental contaminants pose a threat to health,” wrote a researcher whose work is supported generously by chemical and pharmaceutical corporations. Appearing a month later in the same journal that carried the above quote was a review of Dr. Sandra Steingraber’s book, Living Downstream. It said “the work product of an environmentalist is controversy,” and added that the book “frightens, at times misinforms, and then scorns genuine efforts at cancer prevention through lifestyle change.” The writer of this critique is the Director of Medicine and Toxicology for W. R. Grace & Company, which paid $8 million to settle claims brought by the families of seven Woburn, Massachusetts, children and an adult.
who developed leukemia after consuming water shown to be contaminated by chemicals dumped by that company. Now that the events of the Woburn contamination have been documented in the book A Civil Action and in the movie by the same name, perhaps the public will begin to understand the undercurrents propelling the cancer epidemic, and blocking its reversal.

The tactic of labeling as controversial factors that adversely affect health and the environment is a common ploy used to control the message. "Controversy" is invoked to shut out discussion and alternative points of view. As long as the purveyors of toxic exposures can persuade the public to believe that there is reason not to consider a point of view, nothing will be done to change the current unacceptable reality of the cancer epidemic.

Some scientists and lay persons will not agree with my analysis of the links between chemicals, radiation, and endocrine disrupters and cancer. Many will demand more "proof," cite research that failed to demonstrate clear connections between "substance-X" and cancer, or suggest the need for more research. I encourage honest skepticism in the search for scientific verity, and encourage research, that is, independent research, free from economic pressures. However, while we do yet one more study, the Precautionary Principle must take precedence. This means we must take action to safeguard the health of the public and of the environment in the face of uncertainty.

I challenge the reader: If cancers are not caused by chemicals, endocrine-disrupting chemicals, and ionizing radiation, what are the causes? How else can one explain the doubling, since 1940, of a woman’s likelihood of developing breast cancer, increasing in tandem with prostate and childhood cancers? Parallel with cancer has been the increase in chemical and nuclear industries. Do that many women have faulty "lifestyles"? Did the children in Woburn develop leukemia because of their faulty "lifestyle"? Or did they get sick because they drank water contaminated with chlorinated solvents?

While the diagnosis and treatment of cancer properly falls within the medical profession, all too often, physicians have failed to ask the pertinent questions as to why a patient developed cancer. Why do so few physicians probe into the environmental, workplace, and lifestyle history of their patients? Is it lack of training? Not enough time? Lack of curiosity? Given the current state of medicine and science, the prevention of cancer is clearly in the realm of economics and politics, and the ramifications have profound social consequences.

I am a physician, and my perspective on cancer and its many causes developed while listening to and examining some 8000 patients for the past 30-
plus years. My growing frustration over the lack of knowledge about causal links to disease by patients and their physicians, the lack of questioning as to causes of illness, and even worse, the lack of curiosity as to why a person got sick, led me to write Chemical Exposure and Disease, now in its second edition. The new book you are reading now, Life’s Delicate Balance: Causes and Prevention of Breast Cancer, continues as an extension of my previous book.

As much as entrenched economic powers fear loss of profit, the other side of the economic equation—the human and economic costs of cancer—must be addressed. Staggering are the economic costs for hospital stays, medical examinations, laboratory tests, pharmaceuticals, special equipment, yes, even funeral services, and on and on. The destruction of so much of our earth’s resources—water, air, soil, forests, food—is intricately linked to the worldwide cancer epidemic.

No less are the costs of pain inflicted on the patient, the patient’s spouse, family, friends, coworkers, and society at large. The talent, skills, and productivity lost by persons suffering from cancer, undergoing surgery, radiation, chemotherapy, and recuperation are irreplaceable. “The average woman killed by breast cancer loses 20 years off her life. Thus, with approximately 46,000 women killed each year by breast cancer, we are now losing nearly a million person-years of experienced, productive women from this disease.” For those women, suffering alone, the physical and emotional burdens of cancer are rarely considered or mentioned. These all are part of an increasingly large economic and social burden.

My interest in social disruption as a consequence of cancer was expanded when, in 1993, I was appointed both an Adjunct Professor of Sociology and an Associate Member in the Graduate Faculty at Western Michigan University. It is in this larger context where the burdens of cancer upon the person, the family, and society are played out. This social, economic, and political arena is where we must focus and act if we are to achieve prevention of cancer. Defeating cancer requires understanding causes, and then addressing the factors in those causes: scientific, medical, political, economic, and social.

While not exhaustive, this book is intended to be a source of information about known links to cancer, “lifestyle” included. May this information provide a framework to expand this knowledge. This book is dedicated to all who are willing to work for prevention.

Janette D. Sherman
ALL LIFE IS CONNECTED
CANCER IN HUMANS AND WILDLIFE

Man has lost the ability to foresee and to forestall.
He will end by destroying the earth.
—Albert Schweitzer, quoted in Silent Spring

WILDLIFE-HUMAN LINKS

It may be that biologists, rather than physicians, will be the major contributors to the health of our planet and its people. It was Rachel Carson, a biologist, who researched and wrote of the harm to wildlife caused by the combined action of pesticides and radiation. In the tradition of the observant biologist is Theo Colborn, who, with her colleagues, provided a significant breakthrough in understanding the hormonal effects of environmental contaminants. In July 1991, a gathering of some of the world’s most astute scientists was held at the Wingspread Conference Center in Wisconsin where they defined the pattern of diverse endocrine malfunction seen throughout the animal kingdom. They revealed a picture of the Brave New World we should rigorously seek not to leave as a legacy to our children.

The conferees, studying wildlife over the globe, described ominous findings of disease and death linked to environmental pollution. Exposure to toxic chemicals that possess unintended hormonal actions has resulted in anatomic, physiologic, reproductive, carcinogenic, and behavioral abnormalities across all forms of animal life: in mollusks, fish, birds, seals, and rodents. These creatures are to we humans as canaries were to the miners. We must understand that the destruction of eons of evolutionary function and development in wildlife foreshadows destruction of the entire biosphere, humans included.
These widespread adverse effects were attributed to xenoestrogens. *Xeno-* comes from a Greek origin, meaning “foreign.” Foreign itself is not bad: else how do we share and spread culture and ideas? But xenoestrogens are less foreigners than invaders, gaining entrance by the Trojan horse of seemingly harmless routes: milk, meat, cheese, fish, the products we use to nourish ourselves and families. Like the invaders of Troy, after the xenoestrogens gain entrance to the bodies of animals and humans alike, they weaken defenses and wreak their harm of cancer, hormonal disruption, immunological abnormalities, and birth defects.

Xenoestrogens are an insidious enemy, but they have had help from powerful allies: the purveyors of products and chemicals, and legislators, regulators, and scientists reluctant to bite the money-laden hands that feed them.

Wingspread researchers found that birds exposed to xenoestrogens show reproductive failure, growth retardation, life-threatening deformities, and alterations in their brains and liver function. "There is direct experimental evidence for permanent [organizational] effects of gonadal steroids on the brain as well as reproductive organs throughout life."3 This means that offspring whose brains have been altered are unable to function as had their parents. They become different in ability or function.

This means that the sea of hormonally active chemicals in which the fetus develops may change forever the health and function of the adult, and in some cases, may alter the course of an entire species.4 Worldwide there are reports of declining sperm counts5 and reduced ratio in births of male babies.6 Without the capacity to reproduce, a species ceases to exist. Extinction is forever; a species loss has never been reversed.

The data derived from animal observations are unequivocal: breast and genital cancers, genital abnormalities, interference with sexual development, and changes in reproductive behavior are all expressions of a root cause. A possible connection between women with breast cancer and those having children with reversed sexual orientation is a question that bears study. This is not an idea from science fiction, considering what we have learned from observing wildlife and the effects of inappropriate hormonal influence upon the breast, brain, and reproductive organs. If an unequivocal answer were to emerge from human observation, it could have a significant impact upon the prevailing political and economic landscape, and may finally settle the nature or nurture issue of sexual orientation.
SILENT SPRING—SILENT WOMEN

Considering the accumulated knowledge linking chemical and radioactive contamination of the environment with increasing breast cancer rates means we must focus our energies and efforts on prevention.

Early were the eloquent words and pleas for prevention from Rachel Carson. Her book, *Silent Spring*, originally published in 1962, while she herself was suffering from breast cancer, is still a bestseller. Ms. Carson documented wholesale killing of species; animals, birds, fish, insects; the destruction of food and shelter for wild creatures; failure of reproduction; damage to the nervous system; tumors in wild animals; increasing rates of leukemia in children; and chronicled the pesticides and chemicals known at that time to cause cancer. This was over 30 years ago!

Carson's is a book for every citizen, for without understanding of our collective actions and permissions, we cannot govern democratically. In Australia, a citizen is required to vote. In the United States, proclaimed by some politicians as the “greatest democracy on earth,” often fewer than 50% bother to vote in a major election. Of those who do take the time to register and vote, few are sufficiently alert and/or educated to vote with intelligence, thought, and compassion. Requiring participation in the governance of one's own country is not a bad idea. Requiring thoughtful voting may be more difficult, especially when it comes to such issues as cancer, pesticide use, consumer products, nuclear radiation, toxic chemicals, and environmental destruction. Taking this thought one step further, this democracy could do far worse than to require reading of *Silent Spring* as a requirement to vote! Radical? Perhaps. But is the ongoing cancer epidemic any less radical?

One successor to Ms. Carson has emerged in the person of Sandra Steingraber, an ecologist, poet, and scientist. In her book, *Living Downstream*, she writes eloquently of the connections between environmental contamination and cancer. Dr. Steingraber was diagnosed with bladder cancer at age 20, a highly unusual diagnosis in a woman, a young woman, a nonsmoker and nondrinker. She pursued the question, why? She realized a connection with our wild relations and she asks:

Tell me, does the St. Lawrence beluga drink too much alcohol and does the St. Lawrence beluga smoke too much and does the St. Lawrence beluga have a bad diet . . . is that why the beluga whales are ill? . . . Do
you think you are somehow immune and that it is only the beluga whale that is being affected?

The portion of Dr. Steingraber's book that struck me most personally was when she says:

First, even if cancer never comes back, one's life is utterly changed. Second, in all the years I have been under medical scrutiny, no one has ever asked me about the environmental conditions where I grew up, even though bladder cancer in young women is highly unusual. I was once asked if I had ever worked with dyes or had been employed in the rubber industry. (No and no.) Other than these two questions, no doctor, nurse, or technician has ever shown interest in probing the possible causes of my disease—even when I have introduced the topic. From my conversations with other cancer patients, I gather that such lack of curiosity in the medical community is usual.

I take her words as an indictment of the medical and scientific establishment, whose point of view must be changed. Certainly the lack of curiosity among physicians, scientists, policymakers, and politicians has contributed to the epidemic of illness among humans and wildlife alike.

An equally talented woman is Terry Tempest Williams, an ecologist and wildlife researcher, whose book, *Refuge: An Unnatural History of Family and Place,* tells the story of her Utah family, whom she labels “a clan of one-breasted women.” Ms. Williams contrasts the life-affirming awareness of the Great Salt Lake wildlife refuge against the erosion-of-being, as cancer takes away the women in her family: her mother, her grandmothers, and six aunts. She writes: “I cannot prove that my mother Diane Dixon Tempest, or my grandmothers, Lettie Romney Dixon and Kathryn Blackett Tempest, along with my aunts, developed cancer from nuclear fallout in Utah. But I can’t prove that they didn’t.”

Times are changing. It is becoming impossible to ignore the carnage of endocrine-disrupting chemicals, nuclear radiation, and chemical carcinogens, alone and in combination, invading nearly every family with cancer.

Facing this reality may be too much for some people, afraid to look, or afraid of being the next victim. The story of cancer is not an easy one, and neither is cancer. But if we do not exert our efforts to prevent this disease, we doom our children and grandchildren to repeat our collective errors.

What does it take to change from environmental destruction and random killing to affirmation of life? Can the protection of life for ourselves and our
environment be accomplished by women with breast cancer; the women at risk for breast cancer; the families of breast cancer victims? Who should lead? If we citizens can’t and don’t try, what are our alternatives?

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8. Ibid., pp. 137 and 138.

Perhaps the number one scientific topic for the last decade of this century has been the identification of genetic links to disease. But it is well to remember that genetic means more than merely inherited. We know that most babies arrive on this earth with fully functioning genetic systems, despite varying ethnic backgrounds. While some cancers may arise from an inherited genetic defect, we know that many more arise from damage to the genetic machinery of normal body cells, damage that occurs during a lifetime. Genetic damage is the result of exposure to certain chemicals and/or various forms of radiation, and the damage occurs randomly. Genetic damage can also result from the formation of free radicals during normal metabolic processes. It is important to understand that cancer develops in healthy people ... previously healthy people. We develop cancer when our bodies, normally functioning, are altered by submicroscopic forces, chemical and physical.

First let's look at normal cell growth. Life is chemistry in action, the switching on and off of life-giving systems and genes. All life is subject to the rules of chemistry, from the smallest virus to the largest animals, humans included.

All human life begins as two single cells, an egg and a sperm, that combine into one and develop into the miracle of a new being. An infant, a bird, even some plants begin this way. Two cells double to become 4, which double again
and again to 16, 32, 64, on and on. But the developing being doesn’t form randomly. The nervous system, the limbs, the heart, each develops in its own time, place, and form, directed by chemical messages embedded in each cell’s genetic material.

The sequence of switches, the timing, the combinations, the number, the chemical milieu are all critical, else the developing being fails to thrive or is born with physical or developmental defects. We have learned that the cells of the newborn may already hold the key to the destruction of the future adult.

Each of us, inside our covering of skin, is composed of organs, made of various tissues, composed of cells. Our cells, in turn, are complex factories of life-sustaining biological processes, under control of genes that are composed of deoxyribonucleic acid (DNA). Our existence results from an expression of DNA components, complex in number and arrangement. We humans have 46 chromosomes in the nucleus of each cell. Inside of each chromosome are from 50,000 to 100,000 genes, made of DNA, the carriers of the genetic code—our personal and unique biological, physiological, and human history. That’s 2.3 million to 4.6 million separate entities for each cell, developed over millennia, and programmed to work in time-dependent and environment-dependent coordination. Damage to any one of these separate entities may cause a cell to go awry. The life of every plant and animal is derived from similar genetic components.

Each cell in a person’s body contains genes identical to every other cell. Whether a cell develops and functions as a liver cell or a thyroid cell depends upon which genes are “switched on” or “switched off” in which sequence, in which combination, and at which particular time.

Switching-off, or suppression of cell activity, is a necessary event that happens in adult and embryo cells alike. A human needs two eyes of just the right size and in the right place, one nervous system, complete and functioning, and a heart, with all chambers intact and in the right place. We cannot live with organs of uncontrolled size, nor with organs that do not properly function.

The DNA itself consists of a sequence of just four simple chemicals. These can be arranged and rearranged in different order and patterns to make different genes. Differences in arrangement make possible personal differences, even between members of the same family.

These chemicals of life are named adenine (A), thymine (T), cytosine (C), and guanine (G). These are relatively simple chemicals: adenine and guanine
are purines, and cytosine and thymine are pyrimidines. A is always paired with T, and G with C. When each is attached to a simple sugar it forms the basic stuff of DNA. The arrangement and sequence of the purines and pyrimidines are like notes on pages of music. Their arrangement and sequence determine whether a song, or whether cacophony and static results. The conductor of this symphony of life is DNA, the double helix on which the notes are arranged. It is this song, this entire symphony, that transmits messages to the organism to produce proteins, enzymes, hormones, the energy systems—all the processes that make up life.

DNA carries the genetic code of all living entities—plant and animal alike. It is DNA that determines the uniqueness of each person. It is DNA that is passed to the offspring from the parents. It is DNA that controls all life-giving processes; thus to understand cancer, we must understand life and its processes. Life is both hardy and delicate at the same time. Damage to the genetic machinery of individual cells can trigger a series of miscalculations, altering a cell's normal function. When a gene is damaged by radiation or chemicals, or receives misinformation from a chemical messenger, and the mistaken signal is not corrected, the result is inappropriate or uncontrolled growth. This is the basis of cancer.

Figure 2.1
Steps in the cancer process.
Cancer develops in healthy people. Cancer strikes children and adults alike. Cancer is life uncontrolled and occurs when a chemical cascade is set in motion that is difficult-to-impossible to reverse.

Following various steps along the way, from normal to frankly abnormal cells, provides understanding of the cancer process. See Figure 2.1. Cells can be studied under the microscope and tested with biological techniques. These studies show that neoplasia, literally "new growth," proceeds in a sequential fashion. That is, increase in the number of cells (proliferation); increase in size of each cell (hyperplasia); change in the basic structure (metaplasia); to frank tumor growth. Tumors may be either benign or malignant (cancerous), and each can spread locally and/or to distant sites.

These same uncontrolled processes occur throughout the living world: in humans, fish, turtles, birds, cattle, cats, dogs, even plants. All living creatures can develop the uncontrolled growth we call cancer. No life is exempt from cancer. Claims have been made that sharks don't develop cancer, but alas, they too succumb to cancer. To learn more about this, I visited the laboratory of Dr. John Harshbarger, Director of the Tumor Registry in Lower Animals for the Smithsonian and now at George Washington University. Dr. Harshbarger showed me tumors taken from sharks, benign and malignant, and from various organs. He explained that cancer development in these animals was a function of where the sharks had lived, in clean or polluted waters.

Alteration of the kind, sequence, or arrangement of DNA's components can change irreversibly the function and growth of a person, animal, or plant. Alterations in reproductive cells, the sperm or the egg, may be transmitted to the offspring, changing the life of that offspring, expressed as functional or physical defects, and with the potential to be transmitted to future generations. Defects in an offspring result from damage to the germ cells or to the embryo/fetus as it is developing.

Alterations in any of the other cells of the body, called somatic cells, may result in cancer. Cancer, the body's somatic cells gone awry, can be considered the destructive offspring of the body's tissues. A variety of insults, chemical and radiant energy, can change the function or form of an originally normal cell, sending it on the path to malignancy.

Changes can occur in any of the steps of normal cellular function: simple repair, chromosomal expression, gene alterations or deletions, enzyme changes, and amino acid substitutions. We have learned that even irritation, as from chronic formaldehyde exposure, results in increased cell-turnover, the
need for repair, and the potential for interference with repair. This cascade helps explain not only hyperplasia, but the progression to metaplasia and cancer. Some alterations may be reversed by a cell’s innate repair mechanisms; some alterations may go unnoticed; but other alterations become permanent and life-threatening, as when a cancer begins.

Like reproductive development, cancer starts with a single cell and by doubling and doubling, grows until a mass may be felt, as a lump in one’s breast. Left unchecked, the growth may invade neighboring tissues. Sometimes cells break off and travel by the blood and lymph to local and distant parts of the body. These distant growths are called metastases.

Progressing through this book, the reader will find information concerning agents that alter the way cells grow and function. Included in the discussion are descriptions of specific agents. These agents include hormones, pesticides, industrial chemicals, and nuclear radiation. Included are some sources of these damaging agents, and steps we can take to stop the ongoing assault on life called cancer.

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1 ALL LIFE


8. Ibid., pp. 137 and 138.


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chemicals, or receives misinformation from a chemical messenger, and the
mistaken signal is not corrected, the result is inappropriate or uncontrolled
growth. This is the basis of cancer.

Figure 2.1
alike. Cancer is life uncontrolled and occurs when a chemical cascade is set in motion that is difficult-to-impossible to reverse. Following various steps along the way, from normal to frankly abnormal cells, provides understanding of the cancer process. See Figure 2.1. Cells can be studied under the microscope and tested with biological techniques. These studies show that neoplasia, literally "new growth," proceeds in a sequential fashion. That is, increase in the number of cells (proliferation); increase in size of each cell (hyperplasia); change in the basic structure (metaplasia); to frank tumor growth. Tumors may be either benign or malignant (cancerous), and each can spread locally and/or to distant sites. These same uncontrolled processes occur throughout the living world: in humans, fish, turtles, birds, cattle, cats, dogs, even plants. All living creatures can develop the uncontrolled growth we call cancer. No life is exempt from cancer. Claims have been made that sharks don't develop cancer, but alas, they too succumb to cancer. To learn more about this, I visited the laboratory of Dr. John Harshbarger, Director of the Tumor Registry in Lower Animals for the Smithsonian and now at George Washington University. Dr. Harshbarger showed me tumors taken from sharks, benign and malignant,
and from various organs. He explained that cancer development in these animals was a function of where the sharks had lived, in clean or polluted waters. Alteration of the kind, sequence, or arrangement of DNA's components can change irreversibly the function and growth of a person, animal, or plant.

Alterations in reproductive cells, the sperm or the egg, may be transmitted to the offspring, changing the life of that offspring, expressed as functional or physical defects, and with the potential to be transmitted to future genera.

Defects in an offspring result from damage to the germ cells or to the embryo/fetus as it is developing. Alterations in any of the other cells of the body, called somatic cells, may result in cancer. Cancer, the body's somatic cells gone awry, can be considered the destructive offspring of the body's tissues. A variety of insults, chemical and radiant energy, can change the function or form of an originally normal cell, sending it on the path to malignancy. Changes can occur in any of the steps of normal cellular function: simple repair, chromosomal expression, gene alterations or deletions, enzyme changes, and amino acid substitutions. We have learned that even irritation, as from chronic formaldehyde exposure, results in increased cell-turnover, the
need for repair, and the potential for interference with repair. This cascade helps explain not only hyperplasia, but the progression to metaplasia and cancer. Some alterations may be reversed by a cell's innate repair mechanisms; some alterations may go unnoticed; but other alterations become permanent and life-threatening, as when a cancer begins. Like reproductive development, cancer starts with a single cell and by doubling and doubling, grows until a mass may be felt, as a lump in one's breast. Left unchecked, the growth may invade neighboring tissues. Some times cells break off and travel by the blood and lymph to local and distant parts of the body. These distant growths are called metastases. Progressing through this book, the reader will find information concerning agents that alter the way cells grow and function. Included in the discussion are descriptions of specific agents. These agents include hormones, pesticides, industrial chemicals, and nuclear radiation. Included are some sources of these damaging agents, and steps we can take to stop the ongoing assault on life called cancer.


3 RISKS FOR CANCER


12. Soto, A. M., Chung, K. L., Sonnenschein, C. The pesticides endosulfan, toxaphene and dieldrin have


31. As of November 1993, it was estimated that there were 10 million users of Prozac or similar products. Four years after Prozac was marketed, it brought over $1 billion in sales to the manufacturer, Eli Lilly. Thompson, T. The wizard of Prozac. Washington Post. pp. F-1,5. November 11, 1993.


1. Both documents are available from the Medical Board of California, 1426 Howe Avenue, Suite 54, Sacramento, CA 95825. FAX: 916-263-2479


4. Gofman, J. W. Preventing Breast Cancer: The Story of a Major, Proven, Preventable Cause of This Disease. Committee for Nuclear Responsibility, Inc. PO Box 421993, San Francisco, CA 94142. 1996. This table was adapted by Dr. Gofman from his book, pp. 172-181.


Ten-year risk of false positive screening mammograms and


Recently I gave a seminar to a group of about 100 students, science majors at Millersville University in Pennsylvania, and asked for a show of hands from those who had not heard about Three Mile Island (TMI). To my surprise, more than a few raised their hands. When TMI released its radiation on February 28, 1979, many of the students had not yet been born, so perhaps...
not knowing is somewhat understandable. On the other hand, it is difficult to comprehend this lack of information. The university is situated in Lancaster County, an easy bicycle ride from the TMI power plant, situated on a small island in the Susquehanna River.

Does this deficit in knowledge result from lack of curiosity, from lack of education, or is it a head-in-the-sand reaction to an ongoing source of hazard?

Whatever the reason, what we do not know and what we do not pay attention to may, in the end, cause us harm.

For this reason, it is necessary to have some perspective on the history of radiation exposure. Except for cosmic radiation, and that which emanates from certain rock formations, radiation hazards are a new man-made phenomenon, threatening life for fewer than seven decades.

42 43

RADIATION FORGOTTEN

The short-term memory of this nation appears remarkably impaired: a kind of collective Alzheimer’s condition ... whether this impairment is purposeful or by neglect remains to be seen.

A slim volume, Operation Crossroads-The Official Pictorial Record, I of the first atomic bomb tests on the Marshall Islands,
published over 50 years
ago, is enough to give a person nightmares. How did these
tests and consequent releases of radioactive material from SOO-plus bomb
detonations
remain so buried in the public’s memory?

In a foreword to the book, Vice Admiral Blandy, the Commander of
Operation Crossroads, wrote of the atomic bomb: [it] "is the most lethal
destructive agent yet devised by man. Its energy release is staggering; its
radioactivity is slow-killing poison."

Prior to the blasts on Bikini Atoll, three atomic bombs had been deto-
nated, the first on July 16, 1945, in the desert near Alamogordo, New
Mexico, and the next two, less than a month later, over the Japanese cities
of Hiroshima and Nagasaki. Despite evidence of overwhelming
death and
destruction, the official opinion was that the bombs dropped on the cities in
Japan "were of little significance from a technical point of view. They did
provide data concerning the effect of the bomb on a city of the Japanese
type; but this [sic] data was entirely in the form of rough estimates, proving
little." 2 Amazing is the power of language.

Witnessing the two Bikini tests were 42,000 persons, all male except for
37 women nurses. Cameras, which recorded more than 50,000 stills and
1,500,000 feet of movie film, revealed details that the human eye could not
tolerate. Among the observers were members of all the military services,
civilian scientists, and politicians. One photograph memorializes five
Congressmen dressed in business attire and parachutes at Washington's
National Airport preparing for their trip to the Pacific test site. 3

Bikini is a tiny island, sitting upon a coral cap thousands of feet thick. Part
of the Marshall group of islands, Bikini is situated 2000 miles southwest of
Hawaii. It has a lagoon some 20 miles long and half as wide. Bikini is 250
miles north of Kwajalein, the base for Dave's Dream, the B-29 that carried
the bomb. The Bikini lagoon afforded anchorage for a range of ships to be
tested by both aboveground and undersea detonations. The first blast,
named Test Able, occurred on July 1, 1946. The second, the more destructive
underwater blast, named Test Baker, was released on July 25th, 9:00 AM

Bikini time.

This was an exercise in killing: "The islands were sprayed with DDT to
insure healthful condition of the Task Force personnel,"4 and "Rotenone [a
pesticide toxic to fish] was placed in the current along the outer reef, and fish gathered in as they came to the surface," so that they might be identified and tested. s Bikini had been an idyllic tropic island connected to others of the atoll by shallow submerged reefs, affording a plentiful supply of fish. The tepid 82 degree F water was perfect for swimming, but swimming was "banned immediately after Test Able until the extent of radioactivity conta mination could be determined. Contamination proved negligible and the ban was lifted." Today the atoll is advertised as a scuba diver's paradise. A Bikini dive master said "everybody who likes wreck diving is dying to go there." So much for a reality check.

For the bomb tests, sailors were lined up on the decks of ships, their backs to the blast origin, shielding their eyes with their arms.8 The rising column of vapor, steam, spray, smoke, and radioactive fission products fed the mushroom cloud, "the radioactivity of which was roughly equivalent to what would exist in the vicinity of 100 tons of radium."9 As this cloud "spew[ed] forth its insidious content into higher altitudes" the lagoon was deemed "safe," largely by Geiger-counting methods, and personnel entered
the area the same day as the blast.

Despite being heavily contaminated and labeled "Danger! Very Radioactive," the target submarine Skate was put back into operation by her crew a few days after Test Able. Sailors "washed" other craft with fire hoses prior to reboarding. Divers, wearing shorts and scuba gear, were sent below to photograph the bomb's effects: "The lagoon was found to be covered with many feet of fine silt, pulverized coral resulting from the bomb's explosive force .... Divers sank into this silt up to their shoulders. Jagged coral heads and radioactivity added to the difficulties."12

"The Test Able shot has been described as a 'self-cleansing' shot since the bomb was detonated in the air and the upward column of gases served to remove most of the radioactive fission products from the lower atmosphere."

Lest we derive comfort from the knowledge of widespread dispersion of radioactive materials over the world, the quote continues: "This 'cleansing action' was not experienced to the same extent in Test Baker, in which the bomb was detonated underwater."13

Plants were studied for possible radiation-induced mutations, and some fish specimens, obtained before and after the blasts, were sent to Washington,
D.e. for study. "The National Cancer Institute supplied white mice with predilections for or against cancer. They were exposed in order to determine whether the intense radiations would produce genetic changes. The mice were returned to the Institute immediately after Test Able to be bred and studied." Many animals were exposed on Bikini, including pigs, goats, rats, mice, guinea pigs, and humans.

For Test Baker, the bomb was detonated underwater. The bomb produced a radioactive cloud fully 2200 feet in diameter, formed from 10 million tons of water hurled into the air. The blast produced intense gamma and neutron bombardment, making radioactive the water’s iodine, potassium, and sodium, and produced greater casualties to the test animals than the Able bomb.

Gravitation took over and the intensely radioactive water fell to earth. The expanding cloud of spray and water produced radioactivity in the lagoon that "persisted for weeks." The water flowed in and out of the lagoon with the tides, mixing with the ocean currents. Meanwhile the remaining radioactive cloud drifted off with the winds.

When the test ships returned to West Coast ports, radioactive residue was
found in saltwater lines and condensers of vessels from the Crossroads tests.

What illnesses were to develop in the Navy personnel and shipyard workers exposed to radioactive isotopes and the ever-present asbestos have not been calculated.

One of the last photos in the aforementioned book is of a goat, suffering from radiation sickness. Fifteen percent of the exposed animals died from effects of radioactivity. Incredibly, it is written: "No exact parallel can be drawn between these figures and estimates of the possible effect of the bomb upon human life."

It was against this background that, 6 years later, with my Bachelor's degree earned, I went to work as a radiation monitor at the "Rad Lab"-the Radiation Laboratory-run by the Atomic Energy Commission (AEC) on the University of California campus in Berkeley. It was a new experience to fill out a security clearance form, and though I entered "human" where it asked for race, I received a clearance to work.

To start, I was given a stack of books, at least 8 inches high, and told to read them cover to cover to learn about radiation. My college majors had been in biology and chemistry, so radiation physics and biology was a new
and interesting subject, an interest I have maintained through the years.

As a radiation monitor, it was my job to check various laboratories and processes for escaping radiation. I carried with me a Geiger counter, and a more specialized alpha-counter, and on some occasions wore a respirator and protective gloves. These were heady days at the Rad Lab with separation of plutonium having been achieved, operation of the cyclotron, discovery of several of the transuranic isotopes, and characterization of a number of radioactive isotopes. It was at Berkeley where Dr. John Gofman discovered two isotopes of uranium and two more of the rare element protactinium, and where Dr. Melvin Calvin did his elegant work unraveling the process of photosynthesis.

In addition to pure science research, cancer patients were treated through the University/AEC program. I recall a number of patients with polycythemia rubra vera, a malignancy of the red cells, being treated with radioactive phosphorus (P 32) which concentrated in the person's bone marrow. On one occasion I monitored an operating room at a nearby hospital as radioactive gold was instilled into a woman's abdomen to treat her
ovarian cancer. My Geiger counter needle was off the scale as I was standing near the doorway. I have no idea whether any of those treatments helped the patients.

The idea that radioisotopes localized in tissues and caused damage became apparent to me when I monitored some of the astatine experiments. The total amount of astatine in the earth's crust totals less than 1 ounce.17 Astatine occurs naturally in uranium ore, but it is one of the rarest elements in nature because it is one of the most unstable: half of any given amount produced decays in only 8.5 hours. Scientists artificially created the short-lived astatine in the laboratory by bombarding bismuth with alpha particles, accelerated to great speeds in the university's cyclotron. Astatine belongs to the same halide chemical family as fluorine, chlorine, bromine, and iodine, and like iodine, astatine concentrates in the thyroid gland. In addition to concentrating in the thyroid, astatine produced mammary and pituitary tumors after a single injection. Following the work at the University of California, identification and measurement of elementary reactions of astatine have been accomplished at Brookhaven National Laboratory.18
This phenomenon of localization and action was a revelation to me, and has served me throughout my scientific life. By knowing the chemical family of an element, one could, with reasonable certainty, predict its site of action and its effect upon living matter. 47

I accepted an opportunity to work directly in biological research and so transferred to the Navy Radiation Defense Laboratory, situated at the Hunter’s Point Naval Shipyard in San Francisco. It was there that we subjected hundreds and hundreds of rats to the effects of thermal and radiation burns. When I left the laboratory in 1954, there was absolutely no doubt in my mind that radiation was harmful, producing effects proportional to exposure.

Despite what had been learned from the research and the enormity of destruction from the Crossroads nuclear blasts, these were not to be the last. One hundred and four nuclear devices were detonated by the United States in the Pacific area. There were 21 additional tests on Bikini, 43 on Enewetok, 12 on Johnson Atoll, and 24 on Christmas Island. Between 1945 and 1989, there were 831 bomb tests. The first were conducted in the atmosphere, and after 1962, mostly belowground in the United States. Of these, 814 were
exploded at the Nevada Test Site. Other test sites for underground explo
sions were Carlsbad, New Mexico; Grand Valley, Colorado; Rifle, Colorado;

Farmington, New Mexico; Central, Nevada; Fallon, Nevada; Bombing

Range, Nevada; two at Hattiesberg, Mississippi; and three at Amchitka,


And what became of the Marshall Islanders? The Bikini population,

numbering 161 persons, was removed from their island home to Rongerik,

a mere 130 miles to the east. Rongerik, one-sixth the size of their homeland,

had inadequate water and food, and within a few months, the Bikinians were

near starvation. They were evacuated first to Kwajalein, then to Kili Island,

also lacking a lagoon the people required for fishing.

On March 1, 1954, Bravo, the first hydrogen bomb, was detonated on the

surface of Bikini reef. This blast, 1000 times more powerful than the preceding

bombs, sent radioactive debris more than 20 miles into the air, drifting over

naval ships stationed 40 miles away and over Marshallese on inhabited islands.

Citizens on Rongelap and men aboard the Japanese fishing vessel Lucky

Dragon developed signs of radiation sickness and one died; while on Bikini,
radiation levels increased.

In the early 1970s three extended families returned to Bikini until reevacuated in September 1978, when their of water and food supply was deemed contaminated with strontium 90 and cesium 137. Of greater concern, plutonium 239 and 240 were measured in the urine of islanders. Plutonium, with a half-life of 24,360 years, is absorbed by the bone marrow, where it releases harmful alpha radiation as it decays. Commenting on the islanders, Robert Conrad of Brookhaven National Laboratory said the findings "are probably not radiologically significant."2o In 1954, the fallout from a hydrogen bomb test released on Bikini Atoll reached nearby Rongelap. Examinations by Dr. Rosalie Bertell found that of 76 "unexposed" Marshall Islanders who returned to Rongelap in 1957, 60% had lowered blood monocyte counts as of 1961. By 1982-86, only 13.7% of 58 remaining Rongelapese had entirely normal blood counts. As for the population who were exposed to the radioactive fallout, as of 1993, Brookhaven National Laboratory with u.s. Congressional funding, still had not released complete blood count data on the exposed Rongelapese. 21
This speculation brings us a half century later and halfway around the globe
from Bikini Island to Long Island. There are questions about Long Island's
Brookhaven National Laboratory (BNL) and other nearby nuclear facilities' contributions to cancer in adults and children. New York State's Attorney General charged that BNL's owner, Associated Universities, "had covered up evidence of widespread contamination, quoting an expert who described it as 'an unanalyzed, undocumented nuclear waste dump.'"22

The release of radioactive materials into the air and water by BNL and the surrounding nuclear power plants, combined with widespread chemical contamination, are suspected to be significant factors in the breast cancer epidemic among the people living in Nassau and Suffolk counties of Long Island. A $19 million study to address the issue of high breast cancer rates on Long Island barely addresses chemical pollution—and the radiation issue, not at all.

A look at any map showing either cancer incidence or cancer deaths demonstrates that no cancers are randomly distributed throughout the population—not any cancers, not anywhere in the world, not even lung
cancer.

Assuming that the smoking habit is fairly evenly
distributed across the
United States population, we find that lung cancer is not
randomly
distributed, and has changed in distribution over time. Analysis indicates
that the pattern of lung cancer is due to factors in addition to smoking
cigarettes. Radiation damage may compound the natural and synthetic
chemical components of cigarettes. Radiation fallout adheres to plants and
tobacco leaves, which have a stickiness about them. Phosphate fertilizer
contains uranium and uranium decay products. Alpha-emitting polonium
210 is in the sticky tars of tobacco and stays in the lungs, typically in one spot
for 10 days.23 Thus, together, the radioactive isotopes and nonradioactive
chemicals are inhaled in the stream of smoke. Breast cancer, like every other cancer, is not randomly
distributed in the population. It is for this reason that study of Long Island and its epidemic of
breast and other cancers is so important. At a public meeting on Long Island,
held at East Hampton's Guild Hall on December 5, 1997, it was revealed that
the New York State Cancer Registry data showed shockingly high breast and
prostate cancer incidence rates in eastern Suffolk County
for the years

1989-1993, for which it could offer no explanation. This new information was compared with the data that had been published in Dr. Jay M. Gould’s book The Enemy Within. The previously released New York State Cancer Registry data showed age-adjusted breast cancer incidence rates for 62 community groupings for the period 1978-87 in which the combined rate for five towns located on the southern perimeter of BNL was 124 cases per 100,000 women. This was 30% higher than the Suffolk County average of 95 cases. Learning this in 1997, residents of the towns of Brookhaven, Bellport, Yaphank, Shirley, and Medford filed a $1 billion lawsuit against BNL after admission that groundwater flows from the lab had contaminated private drinking-water wells in their area. Earlier, in the summer of 1997, Dr. Helen Caldicott and Dr. Jay M. Gould, in an op-ed piece published in Suffolk Life, reported that the New York State Health Department (NY-SHD) had refused to release cancer data for the 62 community groupings for the years 1989-93, although the department had reported a significant increase of 16% for breast cancer for Suffolk County over the previous 1978-87 period. The more recent age-adjusted breast cancer incidence rate for Suffolk County was 110 cases per
100,000 women,
as against the previously reported 95 cases per 100,000.
Under pressure from a Suffolk County Legislative Task Force
that was
considering the effects of Brookhaven discharges, the
NY-SHD offered to
give the task force the updated cancer incidence rates for
the following three
zones of Suffolk County: a central zone consisting of all
towns within 15
miles of BNL, a western zone of all towns west of the
central zone, and an
eastern zone consisting of towns east of the central zone.
Considering both
breast and prostate cancer, the western and central zones
had age-adjusted
rates for 1989-93 that were not significantly different
from the county

Figure 5.1 Millstone 1, 2, & 3 Initial criticalities
10/26/70, 1/17/75, and 1/23/86 Located 3.2 miles
west-southwest of New London, CT Haddam Neck Initial
criticality 7/24/67 Located 9.5 miles southeast of
Middletown, CT Brookhaven Started in 1950 Located in
central Suffolk County, NY Indian Point 1, 2, & 3 Initial
criticality 8/2/62, 5/22/73, and 4/6/76 Located 3 miles
south of Peekskill, NY

Map of the Long Island area showing Haddam Neck, Millstone,
Indian Point,
and Brookhaven reactors. Source: The Enemy Within, Gould,
1., p. 236. Used with
permission of the publisher, Four Walls, Eight Windows, New
York.

average, but for the east zone, which included the affluent
North and South
Folk regions of the Peconic River, the rates were far too
high to be attributed to
chance. For breast cancer, the East End age-adjusted rate had risen by 72% from 75 to 129 cases per 100,000, and was 17% above the county average. The prostate cancer incidence was also significantly higher than the county average.

At the December 5th meeting in East Hampton, statistician Dr. Jay M. Gould pointed out that had the updated rate for the contaminated five towns south of BNL registered the 16% increase in age-adjusted breast cancer incidence attributed to the county, it would currently be about 143 cases per 100,000 women, possibly the highest single area rate in New York State.

If the high rate of 129 cases per 100,000 women in the East End is found to be centered in the area of the North Fork of the Peconic River, then several factors may be in operation. Situated only 15 miles away from the North Fork are the Millstone reactors, located on the Connecticut shore of Long Island Sound. Wind-borne radioactive discharges from the Millstone plant may share with BNL the responsibility for the East End cancer epidemic. Liquid discharges from BNL, contaminated with radioactive tritium 50025 33005 25011 6003 00095 36001 2500 25015 250 36039 36025 36111 09005 25013 3 6 0 2 1 0 9 0 1 3 0 9 0 1 5 09003 36027 36105 4 2
Cumulated per capita emissions of radioactive iodine and strontium from these reactors since 1970s are five times the national average. There are eight counties closest to the four reactor sites. They have a current age-adjusted combined breast cancer mortality rate of 31 deaths per 100,000—the highest in the nation as well as significantly greater than average increases since 1950-54. Note, too, the high combined rate for the 29 counties within 100 miles of these reactors. Millstone 1, 2, & 3, Haddam Neck, Brookhaven, and Indian Point 1, 2 & 3 White Female Breast Cancer Mortality Rates 1950-89 Counties within 50 and 100 Miles of Millstone, Haddam Neck, Brookhaven, and Indian Point Deaths per 100,000 Women County ST Age-Adjusted Percent Change Number of Deaths Mortality Rates 80-84/85-89/1950-54 80-84 85-89 50-54 50-54 50-54 80-84 85-89

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<td>30.7</td>
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<td>586</td>
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<td>69</td>
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<td>26.6</td>
<td>28%</td>
<td>30%</td>
<td>95</td>
<td>201</td>
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<td>Above 5 Counties</td>
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<tr>
<td>Brookhaven</td>
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<td>31.3</td>
<td>32.4</td>
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<td>40%</td>
<td>232</td>
<td>1140</td>
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<tr>
<td>Suffolk NY</td>
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<td>23.7</td>
<td>24.7</td>
<td>4%</td>
<td>9%</td>
<td>49</td>
<td>107</td>
<td>119</td>
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Breast cancer rates in the area surrounding the Haddam Neck, Millstone, Brookhaven, and Indian Point Reactors. Source: The Enemy Within, Gould, J., p. 236, used with permission of the publisher, Four Walls, Eight Windows, New York, NY

and strontium 90 have entered the Peconic River, which divides the east end of Long Island into the North and South Fork areas.

Mary Joan Shea, a Long Island cancer activist, knowledgeable in radiation issues, wrote: "Most of the population on Long Island is within a fifty-mile radius of the BNL (Brookhaven National Laboratory), the Shoreham reactor and the Millstone reactors in Connecticut. If you include a 100-mile radius, Long Island women are exposed to at least eight nuclear reactors-Millstone 1,2, and 3 in Connecticut, Haddam Neck in Middletown, Connecticut, and Indian Point 1,2, and 3 near Peekskill, New York."25 It was the Shoreham
nuclear plant that resulted in a $5 billion dollar legacy, leading to the nation’s highest electricity rates in the nation (Figures 5.1 and 5.2).

Long Island breast cancer activists have urged inclusion of radiation issues 26 in the National Cancer Institute’s Long Island Breast Cancer Study Project and submitted several requests to have the water supply tested for radioactive pollutants. They listed at least 13 known Long Island sites as sources of radiation release. Prime among these is BNL, designated a superfund site because of both radioactive and chemical emissions. "Contaminants have entered the groundwater and plumes have been detected on-site, moving towards the site boundaries, off-site and moving down to the aquifer that is the sole source of drinking water for local communities." These contaminants include radionuclides of uranium, plutonium, cesium 137, cesium 134, strontium 90, tritium, cobalt 60, radium 226, as well as the volatile organic compounds tetrachloroethylene and 1,1,1-trichloroethane.

Long Island has a sole-source aquifer. This means that all the water used by people living on Long Island lies, as in a pocket, under the land where they live, work, dump chemicals, apply pesticides, operate
incinerators and nuclear facilities, and carryon the various activities of their lives. Rainfall carries the contaminants into an aquifer to mix and migrate throughout the water supply underlying the land. Other communities with sole-source aquifers and the problems of water contamination and cancer are Cape Cod and the islands of Hawaii.

The East End of Long Island includes the affluent Hamptons, whose concerned residents, led by the film actor Alec Baldwin, have established a new environmental organization called STAR (Standing for Truth About Radiation) vehemently oppose wasting federal funds on cancer studies that ignore radioactive contamination of communities. Alec Baldwin's mother, Carol, a Long Island breast cancer survivor, is also engaged in raising funds for objective studies of the causes of cancer in the area.

STAR and the Radiation and Public Health Project (RPHP) are engaged in raising private funds to test levels of strontium 90 (Sr 90) in baby teeth, not only in Suffolk County, but across the entire United States. Germane to the Long Island cancer epidemic are publications by Dr. Gould on the issue of radioactivity and cancer. Included in the Radiation and
Public Health Project

series are "Why cancer rates are highest near New York
metropolitan reac
tors," "Radioactivity levels and cancer in Long Island," and "Radioactive
strontium in Long Island baby teeth." 29

It is this last publication that explains the collecting of
baby teeth from

across the United States to assay for the radioactive
strontium load of young
children. Strontium 90, like calcium, is absorbed by bone
and teeth. Sr 90 has
a half-life of 28 years. A pregnant woman absorbs Sr 90
from her drinking
water and diet; consequently, her children’s teeth absorb
the Sr 90. When chil
dren shed their teeth, usually between the ages of 6 and
13, any Sr 90 found in
their teeth is an indicator of radionuclides absorbed
during intrauterine and
newborn life.

Understanding that radioactive chemicals, as first
recognized by Rachel
Carson, interact with pesticides and other industrial
chemicals to cause cancer,

STAR and the RPHP hope to replicate the success of the
first baby teeth

study conducted 40 years ago. This earlier study was led
by biologist, ecologist,

and educator Dr. Barry Commoner 30 and covered the period
of exposure

from 1957 to 1961. Dentists in St. Louis, Missouri,
collected some 60,000 baby
teeth that showed a 20-fold increase in the Sr 90 content of teeth of children born during the peak years of aboveground bomb testing. These findings led to the signing by President Kennedy of the Partial Test Ban in 1963, which ended aboveground bomb testing in the United States.

Since 1992, the German branch of the International Program for the Prevention of Nuclear War, corecipients of the Nobel peace prize, have analyzed 5000 baby teeth. They found a 10-fold increase in strontium 90 in children born in 1986-87, attributable to fallout from the Chernobyl release in the Spring of 1986.

Testing baby teeth for Sr 90 is a simple, inexpensive, noninvasive, and objective way to obtain necessary clinical evidence to coordinate with epidemiological data showing the risk for cancer associated with point sources of ionizing radiation.

Any parent, teacher, physician, dentist, or person interested in public health who wants to contribute children’s teeth to the "Tooth Fairy" research study can do so by calling 1-800-582-3716. You will be given instructions on how to send the teeth. Other information on the project is available on the internet as www.radiation.org.
As of January 1999, the measures of Sr 90 in baby teeth are being conducted by radiochemist Dr. Hari Sharma in Ontario, Canada, at the rate of 80 teeth per month. As of February 1999, early results already show that the teeth of children born in Suffolk county zip codes display an anomalous rise from well below one picocurie per gram of calcium for children born in 1977 to levels as high as 8 picocuries per gram of calcium in 1992.

This is already the same rise found in the teeth of children born between 1951 and 1963 that persuaded Kennedy and Khrushchev to terminate aboveground nuclear bomb tests in 1963. The Suffolk County results clearly could not be the result of past bomb tests. RPHP expects to have several hundred teeth analyzed by the Fall of 1999, and will at that time convene a public press conference to announce their results and to point out that the United States is the only one of two dozen nations that has never measured strontium 90 levels in children, and that the RPHP study proves that such studies should continue in order to pinpoint the particular reactor sources of such dangerously high Sr 90 levels. Long Island is not only in proximity to the Millstone, Haddam Neck, Indian Point, and Brookhaven.
National Laboratory reactors, but is directly downwind from the troubled Oyster Creek reactor, located in Ocean County, New Jersey. RPHP is hoping to secure foundation support to extend the "Tooth Fairy" project to other areas that have significantly elevated cancer rates. Given accumulated knowledge about radiation emission hazards, and the unique conditions on Long Island, one must ask why the problem of radionuclide contamination is not included in the Long Island breast cancer epidemic study. Radionuclides are relatively easy to measure, are independent of any patient's memory, and are, unfortunately, stable in the environment and in the body. Radiation emissions, combined with the load of toxic chemicals used and released on Long Island, presents a ticking time bomb. Antinuclear activist Dr. Helen Caldicott, a pediatrician and former head of Physicians for Social Responsibility, has called for closure and cleanup of the Brookhaven facility. Some parents have expressed concern that rare forms of cancer in their children may be due to releases from the BNL. BNL scientists have formed Friends of Brookhaven to protest suggestions
of hazard from operation of the facility, and have labeled as "overreaction".

the resident’s concerns.

Former Senator D'Amato, a major factor in getting funding for the LIBCSP, when asked about closing BNL said, "I would fight it every step of the way." Still, he did call for closure of the High Beam Reactor at BNL.

These issues often boil down to the politics of jobs. Which will result in greater harm—closing BNL to prevent more pollution to the citizens and the environment, or keeping the lab open to preserve jobs. But which jobs?

If the spread of radiative pollution continues, there will be a shift in the job market to nurses, chemotherapy and radiation technicians, and bereavement specialists. Which kinds of jobs do we want to support?

Why have we not taken action since Rachel Carson wrote Silent Spring, making the connection between radiation, chemical contamination, cancer, and genetic damage? Linked over miles and decades are the Bikini Islanders and the Long Islanders, whose individual suffering could have been prevented.

2. Ibid., p. 8.
3. Ibid., p. 45.
4. Ibid., p. 9.
5. Ibid., p. 35.
6. Ibid., p. 71.
9. Ibid., p. 145.
10. Ibid., p. 141.
11. Ibid., p. 159.
12. Ibid., p. 219.
13. Ibid., p. 143.
15. Ibid., p. 205.
16. Ibid., p. 220.


23. Bertell, R. Personal communication.


Concern for man himself and his fate must always be the chief interest of
all technical endeavors ... in order that the creations of our mind shall be a

blessing and not a curse to mankind. Never forget this in the midst of your diagrams and equations. -Albert Einstein, From an address at the California Institute of Technology, 1931

During the summer of 1997, the media released a story that bombs exploded

at the Nevada nuclear test site between 1951 and 1958 exposed some 160 million people across 3701 counties of the 48 contiguous U.S. states to radiation fallout. Because of radiation carried on air currents and precipitated with rain, people living in Albany, N.Y., parts of Massachusetts, Missouri, Tennessee, North and South Dakota, Idaho, and Montana received as much radiation as residents directly downwind from the Nevada blasts.1 The National Cancer Institute (NCI) estimated that the I 131 fallout from the bomb tests could result in between 11,000 and 212,000 thyroid cancers. Put into more humane terms, that means that between 11,000 and 212,000 people could develop thyroid cancer. Mind you, the estimate of effects from bomb testing considered only I 131 releases and thyroid cancer, not any of the other isotopes that can cause cancer.

Two panels convened by the National Academy of Sciences analyzed the NCI data and came to the conclusion there was no need to
screen for thyroid cancer. Rather they proposed to wait for a malignant growth to become evident, saying there was no evidence of improved survival.

Dr. Robert S. Laurence, a physician from Johns Hopkins School of Public Health heading 57 one of the panels, concluded that "a general screening program was not justified and that it might very well cause more harm than good." 2 The reasoning was that many thyroid lumps that a physician might feel during a physical examination are not cancer, and would have to be investigated further with tissue biopsies.

When a spokesman from the American Cancer Society was asked to comment on the findings, Dr. Clark Health said "I would not be greatly concerned," and further stated "there's a lot of uncertainty about how one translates this kind of dose information into actual risk." 3

If the ACS and the Institute of Medicine from the National Academy of Sciences are not concerned and are unable to make public health recommendations, who should be concerned, given the mountains of information generated since the dawn of the atomic age? How can this news be so easily dismissed?
There is no measurable threshold below which a carcinogenic agent does not cause harm, as demonstrated in a unique study. Animals were given a known carcinogen at various dose levels. Those receiving low doses of a cancer-causing agent developed malignancies, as did those receiving higher doses, but it took a longer period of time for the cancers to be evident in the low-dose range. 4

Early changes in a cell's control machinery are difficult to impossible to measure. Over time, left unchecked, the carcinogenic changes initiated in a cell become manifest. Every exposure carries some risk, and multiple exposures from multiple sources carry more risk, often additive, multiplicative, or synergistic.

Looking at information to date, we have come to the realization that the body is assaulted in multiple ways: pollutants from pesticides and other industrial products; chemical pollutants from incinerators and dumps; radioactive pollutants from bomb testing, power plant operations, uranium mines, and leaking disposal sites; each with the ability to act and interact.

Thus, there is little wonder that the breast cancer rate (indeed, cancer of multiple sites) has increased dramatically over the past
Not just that women are living longer, or that there are better diagnostic methods, the breast cancer rate has risen in each age group. In these four decades there has occurred the rise of significant technologies: chemical production, radiation technology, and the "disposal" of each. Breast cancer is not a coincidence. Radioactivity is an energy form, exposure to which sets in motion, imperceptibly, events to reveal themselves years to decades later. Each and every incremental exposure to any form of nuclear radiation increases the risk of cancer. It is persistent, deadly, silent, and unseen. Radiant energy comes in several forms. The commonest and best-known form of man-made radiation energy is that discovered by Roentgen: x-rays, useful in medicine and industry. X-rays are employed to diagnose and treat disease in human and veterinary medicine. X-rays examine our luggage prior to boarding an airplane. X-rays are used in industry and metallurgy, as for example, to determine if pipeline welding seams are secure. Other forms of external radiation are those delivered by the atomic bombs to the people living in Hiroshima and Nagasaki and to the atomic veterans, both military and civilian, exposed in the course of atomic bomb construction and testing. There are cumulative hazards
associated with exposure to low-level amounts of radiation, whatever the source. The type of radiation determines the biological mechanism and damage. For example, penetrating x-ray emissions cease when the emitting source is turned off, and the deadly gamma radiation from a bomb is of short duration. This is not so with other sources of radiation, such as the radioactive isotopes emitted from weapons testing and nuclear power plants. These latter sources, actually chemicals, emit alpha, beta, and gamma forms of ionizing radiation. Alpha radiation is a charged particle, from the core of an atom, consisting of two protons and two neutrons; beta radiation consists of high-speed electrons escaping from the nucleus of an atom; and gamma radiation is a photon form of energy. The biological effects of exposure to high-level and low-level radiation are very similar to the consequences of exposure to high and low levels of chemicals. Exposures to each, high enough to kill a cell, may impair body functions. If sufficiently high, radiation exposure may kill. Chronic low level exposures to either radiation or chemicals may damage cells, resulting in impairment of immunity, cell division, hormonal function, and repair mechanisms. It is low-level exposure to both external and internal radiation
that represents risk for the development of cancer. Gamma radiation emitted by unshielded sources can be of great danger.

In Taiwan, around 1983, more than 100 buildings were constructed with steel rods contaminated with the gamma emitter cobalt 60. The source of the radiation was not discovered until 1992. By then, some 6000 citizens had been exposed in residential and school buildings. Taiwanese researchers reported that persons chronically exposed to the low-level gamma radiation developed significantly more abnormalities in the nucleus of their white cells than did two control populations. What this means for their long-term health is unknown at this time. Fortunately, 95% were relocated, an action not taken for the Chernobyl population, as we will subsequently learn.

Internal radiation occurs when radioactive chemicals gain entry to the body, ingested or inhaled. Nuclear power plants and nuclear bombs release all three kinds of radiation: alpha, beta, and gamma. Alpha radiation is especially dangerous because of high energy release from particles as they decay. When these long-lived particles accumulate in tissues, cells are damaged and sometimes killed. The resultant genetic
damage to a cell that survives alpha radiation may be transmitted to its progeny many cell divisions later.

The half-life of a radioactive element is a factor in predicting harm. Half life refers to the time for half a given quantity of an element to "decay" into a lower energy form. Importantly, the new form is not necessarily a less harmful form. With each decay transformation, energy is released, causing damage to cells or tissues, wherever the isotope is located.

To give some scope to the enormity of radiation decay, consider the isotope uranium 238. It has a half-life of 4.5 billion years and undergoes both alpha and beta decay, transforming sequentially into isotopes of thorium, radium, radon, polonium, and bismuth before reaching a stable state as lead. During the decay process, U 238 and its decay isotopes become deposited in various parts of the body, including the bones, kidneys, gastrointestinal tract, and lungs.

The poisonous isotope radium, discovered to cause cancer in women who painted the glow-in-the-dark instruments of World War II, persists for a half-life of 1600 years, appearing but a mere flash when compared to
bone-soluble, plutonium 239, with a half-life of 24,390 years. In the history of our earth, plutonium was the primordial isotope. Life did not evolve until most of the plutonium had decayed to uranium. 8

Uranium, isolated from pitchblende, a rock rich in radioactive elements, was the starting material for isolating plutonium. Beginning in 1944, plutonium was produced artificially from uranium in the first nuclear reactors, ending up in bombs and power plants. Now, the United States has on hand 50 tons of 61 "surplus" plutonium, a powerful alpha emitter that deposits in bone. The Department of Energy proposes to "contain" part of the plutonium surplus in a glass/ceramic vitrification process and to burn the rest in commercial power reactors. 9 The communities where these processes will be carried out will be showered with this most toxic of all chemicals. It appears largely unaware, even though the pattern of contamination is predictable, measurable, and most importantly, knowable. Nuclear half-life and biological half-life, while interrelated in effect, are not the same. Nuclear half-life is characteristic of each individual isotope of an element. The biological half-life is the time span over which the element is resident within a body. Some chemicals are released quickly
from the body, excreted in the breath, feces, urine, or breast milk. Still others, such as isotopes of strontium and radium, become embedded in our bones and remain there for years. The radiation released in the process of decay, its path of decay, and the formes) into which an element decays all have a bearing on effects within the body. The level of danger from any radioactive material depends on the type of radiation it emits, the amount of energy involved, the half-life of the element, and the biological pathway(s). Radiation operates at various energy states. Gamma radiation, like x-rays, can penetrate solid barriers, including the human body. Alpha and beta forms of radiation penetrate tissue less easily and cause harm in other ways. Alpha particles have the shortest range, but the largest mass, while beta rays, which are high-energy moving electrons, can travel though thousands of cells before being stopped. Radiation forms do damage all along their path of travel. Changes occur in the electrical state of an atom as electrons are knocked out of their former orbits around the nucleus of an element and thus release ionizing radiation. When ionization occurs in a tissue it results in disruption of chemical bonds and of cellular
components. Such disruption of normal molecules may result in alteration of
an enzyme or protein, mutation of a cellular reproductive function, damage to
DNA, or death of tissue. Further discourse on the physics of ionizing radiation
are beyond the scope of this book; however, the contribution of radiation to
breast cancer and resultant public health ramifications will be discussed. Radiation is used in the treatment of some malignancies, to kill cancerous
cells intentionally. The radiation may be delivered by anyone of the energy
forms: x-ray, gamma, beta, or alpha radiation, depending upon the site and the
needed effect. While the use of medical radiation has undoubtedly prolonged
and saved the lives of many, it is not an unmixed blessing. It is the overuse,
inappropriate use, and misapplication of this technology that is of concern.
There is no controversy about the contribution of radiation to
development of lung cancer, leukemia, and thyroid cancer. Women who
were given x-irradiation to follow the course of tuberculosis treatment; for
evaluation and treatment of scoliosis; and radiated for treatment of acne,
have an increased incidence of breast cancer.1 2 ,13
X-ray "treatments" were foisted upon women for seemingly benign and
self-limiting conditions. Breast radiation and drug administration have been
prescribed to "treat" postpartum breast swelling, an admitted painful but not life-threatening condition that is better controlled with cold packs and a tight-fitting brassiere. A dose-related increase in incidence of breast cancer was seen in women given x-ray therapy for postpartum mastitis, resulting in an increased overall cancer relative risk of 2.2.14 Similar findings of increased breast cancer in women radiated for benign breast disease were reported from Sweden as well,15 and confirmed by Dr. John Gofman in his extensive analyses.16 These and similar extrapolations led to the mistaken assumption that there was a linear relation for all forms of radiation exposure.

Dr. John Gofman relates a number of examples of medicine gone awry, where common sense, and maybe even economics, succumbed to the siren song of technology. Eight hundred and fifty patients, 750 of them younger than 7 years of age, were subjected to x-rays to treat whooping cough at the Boston Floating Hospital in the 1920s.17 At the Mayo Clinic, more than 1000 patients were given x-ray treatment of asthma.18 Considering the comprehensive records maintained by the Mayo Clinic, it would be of sci entific value to know who, among the radiated patients,
developed breast cancer. At the same facility, countless more patients, with dermatological conditions, were given either x-ray or radium therapy.

Increased cancer risk as a result of early-age radiation exposure led Dr. Gofman to express concern for sick neonates, often radiated multiple times to diagnose and correct life-threatening abnormalities and conditions. There is no question as to the trade-offs; early death versus later risk, but a reason to limit radiation to procedures of absolute necessity. Even "routine" chest or dental x-rays carry some risk of cancer. It is the unneeded forms of x-ray we must avoid, keeping in mind that radiation procedures have saved lives.

Addressing breast cancer specifically, Dr. Gofman's research shows that when a woman receives significant radiation prior to the age of 20, she is 63 more likely to develop breast cancer before the age of 35. Japanese women, exposed to the atom bombs at ages as young as 10 years, experienced a greater incidence of breast cancer than those similarly exposed at age 35 or older, suggesting "the breast tissues of adolescent females may be more sensitive than those of older women to the effects of ionizing radiation." Mouse offspring, subjected to gamma radiation in utero,
when followed through their lifetime, displayed not only leukemia, but mammary cancer as well. This may explain why "Baby Boomers" are experiencing a higher rate of breast cancer different from previous rates for women of this age group who were born before bomb testing and nuclear power reactors released their isotopes into the biosphere. Twenty-five years ago, Dr. Gofman and his associates outlined their observations concerning the effects of radiation, reiterated in 1981 and still true. Essentially they are:

- All forms of cancer can be induced by radiation, all having similar increases with increased radiation exposure.
- It takes less radiation at young ages to increase cancer mortality than for adults.
- The cancer rate per radiation unit is reached earlier with predominantly alpha emissions.

The early findings of Dr. Gofman and his associates were not without hazard to themselves; they were attacked by the nuclear establishment, threatened with cuts in both funding and staff. Capturing the conflict between the development of technology and hazards to society, the author Catherine Caulfield wrote: "At the heart of the debate were two very different hazards to society-the hazard of disease and genetic damage and the hazard of totalitarianism." There is concern that neither
hazard has decreased to a safe level in our time. The International Physicians for the Prevention of Nuclear War (IPPNW), corecipient of the 1995 Nobel prize for peace, have published an easily understood compendium of when, where, and how radiation was released worldwide by nuclear testing, and details how poor control of emissions. To describe in words the adverse effects of radiation is not an easy matter.

One can begin with Carole Gallagher'S American Ground Zero-The Secret Nuclear War. Ms. Gallagher's interviews with and photographs of citizens living primarily in Utah and Nevada, close to our nation's atomic weapons test site, are stark and graphic. One person, Augusta Peters, with a soft smile that matches her curly hair, stares straight into the camera. One notices that her chest caves in as a result of double mastectomies. If they, who made decisions to explode those nuclear bombs, receive her stare, would they dismiss her story of radiation exposure as one of the calculated costs of nuclear preparedness?

Cost: a useful and interesting word that has had a metamorphosis. A document uncovered by Ms. Gallagher, in the cost-benefit context, offers a frightening example of the failure of ethics and morality. An Atomic Energy
Commission (AEC) memo describes the people living downwind from the
Nevada test site as "a low use segment of the population." 29

Those "downwinders" might well ask who benefited from being a member
of "a low use segment of the population"? If it was not the radiation-exposed
citizens, who was it, and how did it come about? Let us explore.

A pattern of ignorance and denial emerges when one reads accounts of
Gallagher's radiation victims and survivors. Denial is a common personal
defense when one is confronted with an intolerable situation, impossible to
change, but ignorance is inexcusable. Ignorance results from two forces:

absence or misleading information and/or refusal to learn. In the downwind
area from the Nevada test site, all factors were in operation: misinformation,
lack of information, unwillingness to look at what was available, and of
course, denial. It is not simply denial by the affected population, but by
government as well. It is denial that must be combatted.

While those living in Nevada and Utah bore the brunt of the bomb
releases, radioactive fallout spread eastward. Radiation's adverse effects
were well known before the bombs were set off in the desert dawn. The
adverse effects became more and more apparent with each blast. Complaints of human illness and harm to livestock exposed to fallout were reported, were "investigated," and were suppressed. Extensive research was carried out on animals exposed to radiation's effects. This author worked on such a project in 1953 at the Navy's Radiological Defense Laboratory in San Francisco. Even then, with but a Bachelor's degree, I understood the harmful effects of nuclear radiation. And I was not alone.

It shouldn't have required four decades to make a decision to put public health ahead of nuclear destruction, but until Department of Energy Secretary Hazel O'Leary came into office, it did not appear to be a high priority with either the Atomic Energy Commission (AEC) or its successor, the Nuclear Regulatory Commission (NRC). And neither, it appears, has the National Cancer Institute (NCI) considered radiation-induced cancer of high priority, taking 15 years to release its report. The Nevada bomb-test site is not the only source of radioactive pollution.

Uranium was mined, milled, purified, and fashioned not only into bombs, but put into power-generating facilities, and as we learned from the Gulf War, into munitions. Tailings, the leftover rock from mining, was used for fill and
road construction, spreading contamination across the landscape. Radioactive materials are handled, transported, used, and stored through out this country, indeed all over the world. Adding to the radioactive load is contamination carried by the winds from the Soviet Union’s tests, the Chernobyl catastrophe,31 and bomb tests undertaken by the United States, France, Britain, China, India, Pakistan, and others. Radiation that contami nates a community need not come from nearby. The intense radiation measured in 1953 in Albany, New York, came from a bomb test at the Nevada Test Site, the fallout cloud passing 40,000 feet overhead, and carried to earth in a thunderstorm. 32 . 33 Comparing breast cancer incidence in 1967-75 with a 1951 cohort, Dr. Carl Johnson found a near doubling of breast cancer in Utah women who lived in the fallout path from the Nevada test site. He found 27 cases versus 14 expected cases. 34 Radiation-induced breast cancer susceptibility is increased when exposure occurs in adolescence and early adulthood,35 and is promoted by hormonal stimulation. 36 Japanese atomic bomb survivors have increased breast cancer. 37 ,38 The catastrophic effect of nuclear bombs leads any thinking person to support their ban, but ignored are releases from nuclear power plants, which
for the most part, and with a few stunning exceptions, run quietly, out of sight

and out of mind. Even when releases became public as from Three Mile Island in Pennsylvania, the Fermi plant in Michigan, the Sellafield facility in Britain, and Chernobyl in the Ukraine, there is practically no public outcry,

and the events are wiped from conscious memory. It is not that these hazards came unannounced. The hazards from nuclear radiation were heralded worldwide by independent researchers: Dr. John Gofrnan, Dr. Carl Johnson, Dr. Thomas Mancuso, and Dr. Ernest Sternglass in the United States; Dr. Alice Stewart in Britain; Dr. Rosalie Bertell in Canada; and Nobel laureate Andrei Sakarov in the Soviet Union, all of whom warned of widespread adverse effects.

The enormous costs to build and maintain nuclear power plants is leading to closure of plants and storage of their accumulated radioactive materials,

posing yet another set of perils. Underground storage is proposed, but the earth is subject to earthquakes, floods, storms, migration of materials, and terrorism. We have no idea if this technology will actually contain these long-lived toxins or not. Unappreciated by the public are the enormous costs,

not only of construction, but of transport, containment, and security. And
security may prove to be the most elusive of all.

A clear demonstration of a slow learning curve is the current push to build nuclear reactors in China. In this effort, Westinghouse Electric Corporation, Asea Brown Boveri, Inc., and Bechtel Corporation have joined in a lobbying and public relations effort to stress domestic jobs. The reasons that no new United States nuclear plants have been ordered since 1973 seems to have escaped the public. Do we not understand that radioactive emissions know no boundaries?

A common emission from the nuclear industry, radioactive strontium (Sr 90), becomes deposited in bone with a half-life of 28 years. Sr 90 decays by the release of powerful beta radiation, which damages the bone marrow, the site of blood cell and immune cell formation. In terms of power, the beta radiation of Sr 90 travels relatively long distances, creating free radical (ionization) changes as it passes through a large volume of tissue. This ionization initiates physiologic and biochemical changes in cells within the bone marrow. More than 50 years ago, an issue of the Journal of the American Medical Association described delayed effects upon immune competency and blood
formation in men and women exposed at Hiroshima. 49
Adverse effects upon

immune function from Sr 90 were confirmed in the 1970s by
Sternglass and

by Ito and colleagues. So • 51 Dr. Rosalie Bertell studied
four separate popula
tions, all of whom had been exposed to bone-seeking
radionuclides. These

affected people spanned the globe: a Toronto suburb; Bukit
Merah,

Malaysia; Rongelap in the Marshall Islands; and the
Mississauga First

Nation living on the north shore of Lake Huron. She found
lowered mono
cyte counts in all four groups. 52 Monocytes are formed in
the bone marrow

and are required in sufficient numbers to fight infection
and provide

immune function.

Data supporting adverse effects upon immune function are
those of

Gould and Sternglass, who found an excess of between 20,000
and 40,000
deaths during the summer of 1986. Those disproportionally
affected were

the elderly and those with infectious diseases, and
coincided with the areas

in the United States that received the greatest fallout
from Chernobyl.5 3 We

know little of the effects upon the Lapland Finns and their
reindeer herds

who were the first to recognize the spread of contamination
from the
Chernobyl explosion. Infant mortality and stillbirths rose in areas of Germany receiving the greatest Chernobyl fallout, but by far, people living in the vicinity of the plant were harmed the most. The Chernobyl residents have a marked increase in cancer, immunological abnormalities, birth defects in their children, and even more ominous, permanent genetic damage. Of some 32,000 "liquidators," mostly men between the ages of 35 and 45, who worked on the containment after the Chernobyl explosion, more than 32,000 have become invalids, and some 8000 have died. The testimony of victims, scientists, and observers of the terrible consequences of nuclear power is detailed in Chernobyl: Environmental, Health and Human Rights Implications. Compounding fallout from the Chernobyl release was a United States hydrogen bomb test, called Mighty Oaks, that went badly wrong in April of the same year. The Department of Energy test blast released radioactivity from the test shaft into the atmosphere, and fallout was measured as far away as Burlington, Ontario. There is no way of knowing exactly how much of the current cancer epidemic is related to nuclear bomb production and testing since the 1940s, and from the current operation of nuclear power reactors.
There has been no concerted program to document and map radiation releases from all these sources, but given the known hazards and persistence of radiological isotopes, there is significant reason for concern. An isotope of specific concern for breast cancer is cesium (Cs 137), which is released from nuclear power and bomb production facilities. Cs 137 emits beta particles, with a half-life of 30 years. Cs 137 is in the same family of chemicals as sodium and potassium. Common to sodium and potassium, Cs 137 and its isotopes concentrate in soft tissues, including breast, liver, spleen, and muscle, resulting in near total body radiation during the decay period. As for strontium (Sr 90), the adverse effects upon the bone marrow are not the only concern. As Sr 90 decays it transforms into yttrium 90 (Y 90), which concentrates in glandular organs, including the pituitary gland. The pituitary, located deep within the brain, is the "master gland" that controls various hormones released from the pituitary gland control function of the ovaries and testes, adrenal and thyroid glands, and growth hormone and prolactin secretion. Prolactin is the
stimulant that
causes breast cells to produce milk.

Very low levels of radiation exposure have been
demonstrated to cause an
enhanced, supralinear effect due to free-radical release,
resulting in functional
and physiologic effects, not necessarily due to genetic or
mutational damage.

Supralinearity, as shown in Figure 6.1, simply means that
there is an enhanced
effect at low doses. Curve 2 demonstrates a linear,
straight-line relationship
between dose and effect. Curve X demonstrates
supralinearity, that is, a
greater effect or response at low doses compared to higher
ones. If the lower
part of curve X were extended outward over the range of
doses, as shown by
the dotted line, the adverse effects would be greater than
actually measured.

This sort of low-level damage includes changes in red cell
permeability
and membrane integrity, that is, the ability of substances
to leak in and out
of cells. It involves susceptibility to infection, and
changes in antibody X Z

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response and antibody production. Low-level effects from radiation are echoed in similarly enhanced effects from chronic, low-level exposure to such chemicals as dioxin, and in the adverse effects upon the behavior and the reproductive organs of animals exposed to very low levels of bisphenol-A and other estrogentic chemicals. In other words, one must not become lulled into complacency because doses are low. Exposure to low doses over time, and to doses of multiple agents, either chemical and radiological, or both, carries a measure of harm. Epidemiology, the least sensitive of techniques employed to assess connections between exposure and risk, has demonstrated a link between proximity to radiation-emitting facilities and breast cancer. Adding to the epidemiological data are human case reports, animal experiments, and biological research. Ordinarily, with this much concurrent proof of cause and effect, one should expect performance to protect the public’s health. Unfortunately, this has not been customary. A case in
point are the findings of Drs. Thomas Mancuso and Alice Stewart, two pioneers in the field of radiation hazards, whose 1977 publication demonstrated a link between radiation exposure and death from cancer in the Hanford nuclear workers. These researchers found:

- Radiation levels were always higher for deaths from cancer as compared to noncancer deaths.
- The cancer/noncancer ratio contrasts were greater for deaths after 50 years of age than for deaths of younger persons.
- In three age groups, the proportion of cancer deaths was highest for those receiving the top cumulative radiation dose.

Linking disability data with death certificates, Dr. Mancuso found cancer greatly underreported, with breast cancer deaths among women employed at the Hanford facility not reported 60% of the time. This is a serious omission, since when death data are underreported, a suspected risk becomes hidden and a source of hazard is not addressed.

The same year, Dr. Carl Johnson, director of health for Jefferson County, Colorado, echoed Mancuso’s link between radiation exposure and cancer, and reported increased leukemia in persons living near the Rocky Flats plutonium processing facility, located outside of Denver.

Rocky Flats was a nuclear weapons plant whose plutonium and other
radionuclide exhaust releases date from 1953. Dr. Johnson compared cancer rates in the population living closest to the Rocky Flats facility with those in more distant suburban areas and found that by 1969-1971 there was a 15% overall excess cancer incidence. Those closer to the facility had malignancies that included leukemia, lymphoma, myeloma, and cancers of the lung, thyroid, breast, esophagus, stomach, and colon. Dr. Mancuso's study of the Hanford radiation workers was one of the longest running ever undertaken, involving 35,000 employees, and initially funded by the AEC. When an excess of cancer deaths among the workers was also reported by Washington epidemiologist Dr. Milham in 1974, the response of the AEC was to put pressure on Dr. Mancuso to refute Milham's finding. This, Dr. Mancuso could not do. The next year, the AEC phased out Dr. Mancuso's contract and transferred the study to an in-house group, based at Oak Ridge. In light of the current industry demands for "peer review" these events are all the more revealing, brought out in hearings before a House of Representatives Subcommittee, chaired by Paul Rogers: "It was disclosed at the hearings that the
transfer of the project to Oak Ridge had not been preceded by a request for proposal, that there was no peer review of the contractors, no research protocol, and no principal investigator." One is left with the impression that the decision to stop Dr. Mancuso's research was based not upon science, but upon political and economic factors. While Dr. Mancuso's study of Hanford workers was stopped, the radiation emissions have not stopped. In a 1996 survey of Oregon women living downwind of the Hanford area, researchers found a high rate of hypothyroidism and associated spontaneous abortion, confirming what had been reported 30 years previously by Dr. Ernest Sternglass.

When Dr. Alice Stewart joined Dr. Mancuso's group, she had retired from Oxford University after a career of 33 years. In the years following, Dr. Stewart argued for a halt to the conflict of interest between the Energy Department's various functions and its assessment of radiation effects. She pointed out that the Energy Department is the owner and operator of nuclear weapons sites; it is the principle repository for data on exposed workers, who have but limited access to their own data; and it is the source
of funding for radiation-exposure studies. In other words, it is like asking Dracula to guard the blood bank.

Nearly two decades later, using U.S. Department of Energy (DOE) data,

Joseph Mangano found the Oak Ridge National Laboratory in Tennessee had released Sr 90, Cs 137, and I 131 into the local water supply. Released

Figure 6.2 71 Oak Ridge National Laboratory Selected on September 9, 1942, as a uranium enrichment site. Code named Site X In full operation with 80,000 employees by late 1994. Located 20 miles east of Knoxville, TN

Map of area surrounding Oak Ridge National Laboratory.

also into the air and water were other radionuclides, mostly before 1960. An examination of death records found a 31.8% increase in cancer deaths between the periods 1950-1952 and 1987-1989, continuing to rise from 1988 to 1989, and ahead of the age-adjusted rate of the entire United States. In Anderson County, where the Oak Ridge facility is located, the cancer deaths rose 39.1% compared to a rise of 29.5% in the 12 counties located over 40 miles distant. In the mountainous counties, where rainfall is greater, the cancer mortality was 40.4% compared to 30.3% in the lowland regions.
Three downwind counties recorded a cancer death rate increase of 50.8%,

compared to a 7.1% increase in four upwind counties.7 4
For comparison, 40 years previously, the cancer mortality in the Oak

Ridge area was uniformly below the national average, as demonstrated in

Figures 6.2 and 6.3. Drs. Ernest Sternglass and Jay M. Gould provide compelling evidence

linking releases from nuclear power plants and the epidemic of breast
cancer on Long Island. The researchers reviewed releases from reactors 21205 21001 21199 21125 21051 2113 21207
21057 21231 21171 21053 21147 21235 21013 21121 21095 31106
47027 47157 47151 47025 47067 47067 47133 47049 47013 47079
47159 47141 47129 47001 47095 47063 47067 47175 47079
47041 47105 35 47145 47155 4 7 0 2 9 37115
47015 47177 47175 54 47175 37021 37007 47061 42121 47153
47107 47123 37173 47056 4701 47139 37039 37113 37175 37053
13281 13083 13111 13281 13213 13213 13213 13125 13187 13311
47115 47153 47009
47159 Oak Ridge

"As one of the nation's oldest reactor sites (along with Hanford and Los Alamos),

Oak Ridge has contributed to a 38 percent increase in the combined age-adjusted

breast cancer rate of a group of 20 downwind counties. As in the case of all other

DOE reactor sites located in rural areas with below-average initial mortality rates,

the subsequent mortality increases are too large to be attributed to chance."

-Gould. Oak Ridge National Laboratory White Female Breast Cancer Mortality Rates 1950-89 Counties within 50 and 100 Miles of Oak Ridge Deaths per 100,000 Women County ST Age-Adjusted Percent Change Number of Deaths Mortality
Breast cancer rate in counties surrounding Oak Ridge National Laboratory.


Located most closely to Long Island and New York City. These included the reactors at Indian Point, which began operation in 1961; the Haddam Neck facility, which started in 1967; and Millstone, which began operation in 1970.

The combined releases from these three facilities between 1970 and 1987 was more than three times the 14.2 curies reported for
the Three Mile Island reactor release of 1979. Such comparisons are fraught with problems, not the least of which may be arguments of "safety" by proponents of nuclear industry. The Long Island area reactors had releases occurring over some 17 years, while official measurement of the TMI radiation did not begin until the Saturday following the Wednesday morning leak, resulting in underestimation of the full occurrence.

For either area, releases were significant. The Millstone reactor, 10 miles north of Suffolk County in Connecticut, "released 32.6 curies of airborne I 131 and other fission products, and 581 curies of liquid fission products by 1987, most of it in the period 1972-1979."

Coincident rises in breast cancer mortality were seen in Nassau and Suffolk

Figure 6.4 Millstone 1, 2, & 3 Initial criticalities 10/26/70, 1/17/75, and 1/23/86 Located 3.2 miles west-southwest of New London, CT Haddam Neck Initial criticality 7/24/67 Located 3.5 miles southeast of Middletown, CT Brookhaven Started in 1950 Located in central Suffolk County, NY Indian Point 1, 2, & 3 Initial criticality 8/2/62, 5/22/73, and 4/6/76 Located 3 miles south of Peekskill, NY

Map of the Long Island area showing Haddam Neck, Millstone, Brookhaven, and Indian Point Reactors. Source: The Enemy Within, Gould, 1. Used with permission of the publisher, Four Walls, Eight Windows, New York.
"Cumulated per capita emission of radioactive iodine and strontium from these reactors since 1970s are five times the national average. There are eight counties closest to the four reactor sites. They have a current age-adjusted combined breast cancer mortality rate of 31 deaths per 100,000—the highest levels in the nation—as well as significantly greater than average increases since 1950-54. Note, too the high combined rate for the 29 counties within 100 miles of these reactors."

-Gould. Millstone 1, 2, & 3, Haddam Neck, Brookhaven, and Indian Point 1, 2 & 3 White Female Breast Cancer Mortality Rates 1950-89 Counties within 50 and 100 Miles of Millstone, Haddam Neck, Brookhaven, and Indian Point Deaths per 100,000 Women County ST Age-Adjusted Percent Change Number of Deaths Mortality Rates 80-84/ 85-89/ 1950-54 80-84 85-89 50-54 50-54 50-54 80-84 85-89

Indian Point Westchester NY 30.7 30.7 32.0 0% 4% 586
934 1011 Orange NY 26.4 29.6 28.3 12% 7% 133 219 238
Rockland NY 24.3 29.9 33.1 23% 30% 69 220 265
Putnam NY 38.9 36.1 27.7 -7% -29% 29 76 67 Dutchess NY 20.5 26.2 26.6 28% 30% 95 201 222

Above 5 Counties 28.3 30.1 30.7** 6% 8% 912 1659 1803
Brookhaven Suffolk NY 23.2 31.3 32.4** 35% 40% 232 1140 1285

Haddam Neck/Millstone Middlesex CT 22.7 23.7 24.7 4% 9% 49
107 119 New London CT 22.4 28.0 26.2 20% 26% 97 197 223

2 Counties 22.5 26.6 25.8** 14% 19%** 146 304 342
Breast cancer rates within the area surrounding Haddam Neck, Millstone, Indian Point and Brookhaven reactors. Source: The Enemy Within, Gould, I., p. 237. (Used with permission of the publisher, Four Walls, Eight Windows, New York.

counties on Long Island paralleling the increase in Connecticut, located across Long Island Sound. Peaks in mortality appear to have occurred 7 to 9 years after the startup of the Haddam Neck and Millstone reactors with a 39% increase in deaths in Suffolk County alone for the 3-year periods, 1970-1972 and 1987-1989. It is but ten miles across Long Island Sound from the Millstone reactor to the North Fork of Suffolk County.75 Figures 6.4 and 6.5 demonstrate the location of the three reactors and the breast cancer rates in counties downwind from those reactors. The breast cancer epidemic on Long Island is under study by Columbia University and is funded by the National Cancer Institute. Nuclear radiation
is not included as a part of the official NCI research. An independent and parallel research project by Dr. Jay M. Gould and a panel of experts from the Radiation and Public Health Project is conducting a study of the radiation load on the citizens of Long Island. Dr. Gould has made a call for parents to contribute baby teeth to be tested for radioactive strontium (Sr 90). These teeth, shed when a child is about 6 years of age, are a record of the radioactive material transferred to that child from the time of conception. Dr. Gould hopes the findings may explain why cancer is so high in areas of Long Island that lie in the path of nuclear drift, of both recent and remote release. The 1990 National Cancer Institute Study "Cancer in Populations Living Near Nuclear Facilities" found no excess cancer in 107 counties in which such facilities were located. Expanding the number of "exposed" counties beyond that used by NCI, Drs. Gould and Sternglass found the contrary. They criticize the NCI for including as "controls" some counties well within the fallout area of about 50 to 100 miles downwind from a reactor. The NCI misclassification increased the "control" baseline against which "nuclear" county death rates were measured, so that no significant difference could
be detected. For white women with breast cancer, Gould and Sternglass found a "significant upward deviation from the national trend ... in 268 counties within 50 miles of reactor sites." For 53 nuclear reactor sites that started operation before 1982, the average increase was highest, compared with a 1% increase in breast cancer for the United States as a whole. They found the greatest rise in death rates in the counties surrounding the facilities built in the years 1943 to 1953 that released fission products such as I 131 and Sr 90. These included the nuclear facilities at Hanford, Washington; Oak Ridge, Tennessee; Idaho National Engineering, Idaho; Savannah River, Georgia; Los Alamos, New Mexico; and Brookhaven, New York. All six sites had increased breast cancer deaths for the periods 1950-1954 and 1985-1989, ranging from 11% to 333%, with an average of 33%. Accompanying the 1990 NCI study that was published in the Journal of the American Medical Association was a remarkable statement: It is somewhat ironic that public concern over the potential hazards of normally operating nuclear facilities receives much greater attention than the far greater risks imposed by such voluntary life-style factors as smoking, drinking and diet.

In other words, blame the victim. What about the women with breast cancer who did not smoke, did not drink alcoholic beverages, and exercised, but did
drink radiation-contaminated water, and did eat dairy
products, meat, fruits,
vegetables, grains, and oils produced in the fallout zones
of bomb tests and
nuclear reactors? Is this indeed lifestyle?

Such a statement in a publication of the American Medical
Association, a
well-funded and powerful pressure group, raises other
concerns. One is the
admonition of Hippocrates who cautioned: "First do no
harm." If physicians
are not the patient's advocate, who shall be?
The risks to health from radiation exposure have been
studied and docu
mented. Linked as well are risks to democracy from
suppression and control of
vital information. The books by Dr. Gofrnan, the articles
by Dr. Sternglass, and
the recent book by Drs. Gould and Goldman document
radiation releases and
the adverse effects upon human health and the environment.

Exposure
data support a link between consumption of radioactive
contaminated dairy
products and cancer. The data do not support the "blame
the victim," fat
consuming, "lifestyle" argument.

Radioactive forms of strontium and iodine concentrate in
the nonfat part
of cow and human breast milk. \(^{82}\) Isotopes of radon, formed
during the decay
of uranium, thorium, and plutonium, are readily
fat-soluble, where they, along with two beta releasers, release alpha particles. 83 Citizens of central Wisconsin, with a high breast cancer rate, received radioactive fallout, no matter which way the wind blew, ringed as it is by nuclear reactors. 84 Lending evidence to the issue of radioactive contamination of dairy herds is the finding that, of 16 industrial countries studied, only New Zealand, Australia, Hong Kong, and Israel had declines in breast cancer deaths between 1971 and 1986. 85 None of these four had nuclear reactors:

Figure 6.6 Three Mile Island 1 & 2 Initial criticality 6/5/74 and 3/28/78 77 Major accident 3/28/79 Located 10 miles southeast of Harrisburg, PA Peach Bottom 1, 2, & 3 Initial criticality 9/16/73 and 8/7/74 Unit 1 shut down in 1974 Located 17.9 miles south of Lancaster, PA

however, the southern hemisphere countries of New Zealand and Australia must have received some contamination from tests conducted by France in the south Pacific, and from the British weapons testing at Monte Bello and Maralinga in Australia. Hong Kong is very near the reactor built by mainland China and also must have received some fallout from Chinese nuclear tests. Israel is one of the better examples of
reducing the confounding factors of nuclear fallout and pesticide pollution. While Israel has an advanced nuclear reactor program, Israeli breast cancer deaths, highest when worldwide fallout was greatest between 1976 and 1986, fell 34%, coinciding with restriction of chlorinated pesticide use and cessation of atmospheric nuclear tests in 1980. While the exact contribution of each risk is still unmeasured, and perhaps unknowable, that should not stop society from limiting exposure to these known hazards. In five counties adjacent to the Three Mile Island reactor, breast cancer "increased markedly following normal operation after start-up at TMI and following the accident." Reading that quote again, one is stuck not so much by the admission of risk from the accident, but the risk from "normal operation." Critical words in the sentence are "normal operation." We must increase in breast cancer mortality since 1950-54. Their combined current rate of
27 deaths per 100,000 is close to the nation's highest. The same could be said for the even higher combined rate for all counties within a radius of 100 miles."

-Gould.

<table>
<thead>
<tr>
<th>White Female Breast Cancer Mortality Rates 1950-89 Counties within 50 and 100 Miles of Three Mile Island and Peach Bottom Deaths per 100,000 Women</th>
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<tbody>
<tr>
<td>FIPS County ST Age-Adjusted Percent Change Number of Deaths</td>
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<tr>
<td>Code Mortality Rates 80-84/ 85-89/ 1950-54 80-84 85-89 50-54 50-54 50-54 80-84 85-89</td>
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<tr>
<td>Three Mile Island</td>
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<tr>
<td>42043 Daupin PA 24.5 25.4 28.8 3% 17% 141 212 240</td>
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<tr>
<td>42075 Lebanon PA 22.3 24.5 25.5 10% 14% 50 100 106</td>
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<tr>
<td>42097 Northumberland PA 25.3 31.4 29.8 24% 18% 83 139 141</td>
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<tr>
<td>42107 Schuylkill PA 24.8 24.1 28.1 -3% 13% 154 264 200</td>
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<tr>
<td>Total 9 Counties 23.3 25.6 27.2* 10% 17% 740 1183 1258</td>
</tr>
<tr>
<td>Peach Bottom</td>
</tr>
<tr>
<td>42071 Lancaster PA 26.6 27.2 25.2 2% -5% 182 351 356</td>
</tr>
<tr>
<td>42133 York PA 24.5 27.9 26.1 14% 6% 143 294 309</td>
</tr>
<tr>
<td>24013 Carroll MD 20.7 21.0 25.8 2% 25% 20 50 86</td>
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<tr>
<td>Location</td>
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</tr>
<tr>
<td>24005 Baltimore MD</td>
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<tr>
<td>24025 Harford MD</td>
</tr>
<tr>
<td>24027 Howard MD</td>
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<tr>
<td>24003 Anne Arundel MD</td>
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<tr>
<td>Total 7 Counties</td>
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<tr>
<td>Total Above 16 Counties</td>
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<tr>
<td>Total 56 Counties</td>
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<tr>
<td>Total United States</td>
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Figure 6.7

Breast cancer rates within the area of Three Mile Island and Peach Bottom reactors. Source: The Enemy Within, Gould, 1, p. 239. Used with permission of the publisher, Four Walls, Eight Windows, New York. 79

guard against believing that just because wrong technology has persisted,

that it is normal or acceptable. A further example must be taken from the civil rights arena: slavery was once a "normal" method of doing business. Research done by volunteer canvassers, working with Drs. Carl Johnson and Bruce Moholt, determined the cancer rate around Three Mile Island was 7 times that of similar rural areas. 88 Revealed as well were mutations in plants,

reminding us that all living matter is subject to the laws of nature. A 1990 Columbia University study found no association between cancer
and proximity to releases from the 1979 TMI accident. Once again, faulty
assumptions and legal constraints led to underestimation of effects. More
recently, analysis of the TMI data by Dr. Wing and his associates found an
increase in all cancers, particularly lung cancer and leukemia. 89 The breast
cancer rate is graphically presented in Figures 6.6 and 6.7. But Dr. Wing's study came too late to help the victims. In February 1987,
Judge Lipsett, presiding in the case against Metropolitan Edison, the operator
of TMI, dismissed the claims of 35 plaintiffs stating: At the time of the accident, these plaintiffs were certainly aware of the release of radiation and threatened harm from such a release .... They also knew or should have known that exposure to a radiation could cause adverse effects.90

In other words, if you "knew or should have known" there was a hazard to
your health, you are out of luck. This same defense has been used successfully
to quash claims of harm from cigarettes, incinerators, pesticides, and toxin
emitting factories. Considering recent developments in cigarette litigation,

perhaps victims can hope for justice from the legal system. Realistically, this
closeout maneuver has been used successfully against persons harmed by
dangerous industries and dangerous products. Will the emerging political
climate allow for redress for injury? We must consider very thoughtfully and
carefully our options. They are decreasing in number. Restricting access to information or redress is not new. Those controlling the nuclear industrial-military complex often cite "national security" as justification to exclude the citizen, whose very life and well-being is at risk.

But to be fair, data control is well-established in the corporate world as well, citing "business confidentiality" as an overt reason, while of equal importance are control and profit. In many cases, military and nonmilitary nuclear development and corporate control and profit are one. Martin Marietta operated Oak Ridge, Three Mile Island was owned by Metropolitan Edison, and Rocky Flats was operated by Rockwell International Corporation.

The report of the Advisory Committee on Human Radiation Experiments released on October 21, 1994, contains information applicable not only to the issue of breast cancer, but to civil rights as well. The document states: "Experiments involved the intentional [emphasis added] environmental releases of radiation that (A) were designed to test human health effects of ionizing radiation; and (B) were designed to test the extent of human exposure to ionizing radiation." It is unlikely we will ever know the true number, extent, or type of inten
tional radiation releases, but that document discloses the following, and these

are direct quotes: Eight radiation warfare experiments; the number is at least 53; Four Los Alamos, New Mexico imploding tests involving radiolanthanum. DOE reports that the number of such tests approximates 250; One intentional release from a plutonium production facility (Green Run). Examples of further releases from nuclear production facilities have been found.

Governmental agencies involved in these intentional exposures included

the CIA with its "MKULTRA program of experiments [which] included radiation research; however, as the CIA previously reported, Director of Central Intelligence, ordered MKULTRA files destroyed in 1973," and the Naval Radiological Defense Laboratory (NRDL) which operated from 1947 until "disestablishment in 1969, [when] its library of research reports was evidently dispersed, and basic records were apparently destroyed." The DOE's Intelligence division's "critical data on intentional releases and work done for others ... revealed that these files were essentially purged during the 1970s and as late as 1989," and "in the 1960s, NASA contracted with DOE's Oak Ridge operations to perform a retrospective study of whole body radiation" [that] encompassed over 3000 radiation exposures at over 40 institutions .... In 1981 congressional testimony, NASA stated
that the data had been destroyed in the Routine course of business. "93

Recently declassified documents discuss a United States "'radiological

warfare' program 'to release highly radioactive substances by dropping them

in bombs' ... 'in the form of pellets, aerosol or dust [that] would escape and

spread,' preserving an industrial base, while destroying its skilled workers.'

Additional plans included "'large scale sabotage use' in which radioactive

gases or aerosols would be injected with germ sprays into natural gas mains,'

rendering the victims 'more susceptible to infection from the germs.'94" Senator John Glenn in his opening statement as Chairman of the

Hearings before the Senate Committee on Governmental Affairs on Human

Subject Radiation said: "It is becoming increasingly clear that all too often

the over-riding reasons for the classification of many of the radiation

experiments records was not national security, but instead fear of lawsuits

and personal culpability." 95 John Gofman, M.D., Ph.D., world-famous codiscoverer of uranium 233,

author of four scholarly books on radiation effects, and Professor Emeritus

of Molecular and Cell Biology at the University of California in Berkeley,

writes: Our surest path toward Orwellian unknowledge in the textbooks is control over the preparation of the input parameters for the databases upon which our knowledge rests. Falsify the database, and the greatest geniuses in
the world will arrive at the wrong answer concerning health effects of radiation. 96

As we come to the end of the 20th century and bomb testing of the 1950s recedes from our consciousness, we recently learn, two months after the fact, that the managers of the Hanford Nuclear Reservation released toxic chemicals mixed with plutonium into the atmosphere. The release was the result of a tank explosion that exposed workers and raised concern as to the fate of the plutonium that remains radioactive with a half-life of 24,360 years. Hanford officials are quoted as saying "they do not believe anyone off-site had any exposure and said the toxic plume appears to have dissipated before it reached the public highway."97 Is there anyone who believes otherwise but that what goes up must come down? And down where? And where for however many more centuries after the 24-plus centuries to dissipate just half of that release? The overwhelming accumulation of information leaves little question but that fission products in the diet,98 acting in concert with chemical pollution, cause harm and result in cancer, birth defects, genetic alterations, and immunological and neurological damage. 99 Repeated exposures and exposures to multiple agents increase risk, often in ways unanticipated.
There is little argument but that both chemical toxins and radioactive materials have a compounding effect and increase the dangers of each. The tragic faces, resulting from the Chernobyl nuclear disaster, mixed with industrial pollution in the former USSR, are evident in deformed children and sick adults graphically portrayed in an issue of National Geographic.1°O How many more of the world's people will suffer before we stop nuclear technology?


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81. Gould, J. M., Goldman, B. A. Deadly Deceit: Low-Level
82. Ibid., p. 797.


84. Sternglass, E. I. Personal communication. 11-11-94.


91. Interim Report of the Advisory Committee on Human Radiation Experiments. Appendix B, 3(2). October 21, 1994. On the Committee were the following: Secretary Hazel O'Leary, Department of Energy Secretary William Perry, Department of Defense Attorney General Janet Reno Secretary Donna Shalala, Department of Health and Human Services Secretary Jesse Brown, Department of Veterans Affairs Director Alice Rivlin, Office of Management and Budget Director James Woolsey, Central Intelligence Agency Administrator Daniel Goldin, National Aeronautics and Space Administration

92. Ibid., pp. 17, 18. 87

93. Ibid., pp. 38, 39. The destruction of the CIA data was ordered by Richard Helms, then Director. Perhaps the most
alarming is the CIA MKULTRA program, which was "concerned with research and development of chemical, biological, and radiological materials capable of employment in clandestine operations to control human behavior" (p. E-1.2) and "CIA secretly provided funding for the construction of a wing of Georgetown University Hospital in the 1950s so that it would have a locale to carry out clinical testing of its biological and chemical programs. Dr. Charles F. Geschickter, a Georgetown doctor who conducted cancer research and experimented with radiation therapy, acted as cover for CIA financing." (Ibid., p. E-1.3.)


7 HORMONES


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53. NCR was one manufacturer of carbonless carbon paper, according to Business Week. pp. 69-71. August 12, 1991.


57. Federal Register. 41(64): 14134-14136, April 1, 1976.

58. Lichtveld, M. Y., Susten, A, S. Proceedings of the expert panel workshop to evaluate the public health implications of the treatment and disposal of polychlorinated biphenyls-contaminated waste. ATSDR, HHS, USPHS. 1994

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61. The connection between chemicals that cause sickness and those prescribed to those sick is amply demonstrated by Monsanto's Searle division: Aldactazide, Aldactone, Aminophylline, Calan, Cytotec, Demulen, Dramamine, Envoid, Flagyl, Kerlone, Lomotil, Nitrodisc, Norpace, and Theo-24, products used to control blood pressure, relieve asthma, for birth control, to stop diarrhea, and a nonsteroidal anti-inflammatory drug that causes abortion.


63. INFACT. Bringing GE to Light: General Electric's Trail of Radioactive and Toxic contamination form the Company's Nuclear Weapons Work. P. O. Box 3223, South Pasadena, CA 91031. October 1990.

64. INFACT's film about GE, "Deadly Deception," was nominated for an Academy Award.


In 1995, public hearings were held in California, following which tamoxifen was designated as a carcinogen by the state of California. Substantiating the finding is a 16-page list of articles and comments, relied upon by that state's Carcinogen Identification Committee, available from the California state offices in Sacramento. How did this proven carcinogen become the drug of choice for treating breast cancer, and for the "prevention" of breast cancer? The media hype following the National Cancer Institute announcement that tamoxifen prevents breast cancer bears some scrutiny. It sounds good, but is it really? Tamoxifen has been promoted to two groups of women: those already diagnosed as having breast cancer and those "at risk" to develop the disease. The first option proposed for prevention of breast cancer is a drug: tamoxifen; a second "option" is prophylactic bilateral mastectomy. The latter is hardly an option, and the first is not without harm. Neither addresses the issue of causation and primary prevention.

WOMEN WHO HAVE BREAST CANCER

A woman who has breast cancer is put in the unenviable position of having to decide which of the treatment regimes she is willing to undergo in order to achieve arrest of her disease. When it comes to therapeutic agents for which
there are serious side effects and controversy concerning efficacy, the
problem becomes very difficult. One decision the breast cancer patient may
have to make is whether she ought to take tamoxifen or not. Cancer is a
serious disease, and most of us will do just about anything to put malignancy
at bay. There are studies crediting tamoxifen use with prolonging survival and
decreasing reoccurrence of cancer in the affected as well as the other breast.
The 1987 collaborative treatment trial, utilizing multiple therapies, including
tamoxifen showed a 9.2% better disease-free state and survival in the first 5
years. Unfortunately, after 5 years, these improvements did not persist. But
this was not a revelation: in two earlier studies, only about 30% of women
treated with tamoxifen had a complete or partial remission that lasted for a
year or more. Even the current NCI press release admitted that use of tamoxifen for
more than 5 years showed no improvement, and "showed a trend toward
more adverse effects." Hormonal manipulation for breast cancer is not new,
only different. Previously, surgical removal of a woman's ovaries was the
method of choice to block a woman's own hormones. And when oophorec
tomy was not successful, a woman's pituitary was removed surgically or
destroyed by radiation. It was this procedure, ablation of her pituitary by
implanted radioactive yttrium, that Rachel Carson underwent, shortly before
her death. Like others who underwent these procedures, the results were
often either not effective or incapacitating, or both. Still, some combinations of therapy (both hormonal and chemotherapy)
appear to prolong survival, used in combination with surgery and radiation.
The questions are: which of the 16 or so chemotherapeutic agents, in which
combinations, and at what times will improve our chances of survival? Between 1970 and 1987, more than 3 million women were administered
tamoxifen for a cumulative time of more than 5.8 million patient years.10
Unfortunately, except for specific clinical trials, few records have been kept
on women given the drug for therapy. A review of some 14 different clinical trials in which tamoxifen was given to
women with breast cancer showed worrisome results. Although an increased
disease-free state was shown in all the trials, the overall survival was improved
in but four of the trials, with women older than 50 years achieving the most
benefit. n
TAMOXIFEN AND BREAST CANCER 'PREVENTION'
For this chapter, however, the issue is not only which treatment regime to
follow, but whether to participate in an experiment, one
touted as a breast cancer prevention trial. The story is interesting, if not especially comforting. The name tamoxifen achieved widespread publicity in April of 1994. At that time, physicians across the United States received a "Dear Doctor" letter from Zeneca Corporation, concerning the development of uterine cancer in women receiving tamoxifen, as reported in a large Swedish study.1 A similar study undertaken in the Netherlands reported a statistically significant excess of uterine cancer in the women after taking tamoxifen for 2 to 5 years, correlated with both cumulative dose and duration of use.13 These two studies were echoed by a Danish-British study that "detected endometrial abnormalities at various times from the first tablet of tamoxifen."14 At the same time as the Zeneca letter went out to physicians, a similar communique, the "Dear Patient" letter, was sent to women participating in the National Surgical Adjuvant Breast and Bowel Project (NSABP), the coordinating center for the tamoxifen breast cancer prevention trial, telling them the same thing. But women patients, taking tamoxifen for treatment of their breast malignancies, not in the official NCIINSABP trial, received no
such warning. The Breast Cancer Prevention Trial has enrolled women as human
guinea pigs to test tamoxifen as a "prevention" against breast cancer. The
trial, planned since 1990 and launched in April 1992, enrolled 11,000
women, aiming optimally to enroll 16,000 healthy women, between the ages
of 35 and 78. The trial closed enrollment in September 1997, at which time,
13,388 women ages 35 and older were enrolled. Half of the
women received
tamoxifen and half a nonhormonal placebo. A similar proposal to be
carried out in England as of 1994 was declined by Britain's Medical
Research Council.15 In 1995, researchers at Washington University Medical School in St.
Louis, Missouri, and the Medical School at Dartmouth calculated that for a
50-year-old woman with a risk for breast cancer twice that of an average
woman her age, the increase in longevity would be approximately 9 days.16 The tamoxifen experiment was to run for a 5-year period, but when the
results of the study were released in April of 1998, only 57% of the enrollees
had completed four or more years on the study. The study was carried out at
more than 300 sites in the United States and Canada and by investigators
who have extensive, some, and no experience or training in the proper
conduct of clinical trials, plus little oversight by
Prior to the NSABP tamoxifen investigation, clinical studies under the aegis of NSABP had been carried out at 400 collaborating clinical centers in the United States and Canada; a formidable task to achieve any degree of uniformity, accuracy, and objectivity. Women were recruited from those at high "risk." Risk was defined as women with a family history of breast cancer—a mother, sister, or other close relative. Family history was advanced as a major risk of developing the disease, ignoring other causes of breast cancer. Women older than 60 were included on the basis of age alone. The NCI press release stated: "The risk of developing breast cancer increases with age, so breast cancer occurs more commonly in women over 60 years of age." One can’t argue with the issue that cancer is commoner in older persons than in younger ones, but isn’t one of the reasons for more cancer that the older person has not only lived more years, but during those years has been exposed to carcinogenic agents for a longer period of time? Enrolling the over-60 women, without any other risk factor, also ignores the increase in breast cancer among younger women. Relying on family history for selection is a significant issue. As evidence emerges, the poisoned environment is clearly playing an overwhelming role.
in the increase in breast and other cancers. Little considered is the fact that breast cancer, indeed all cancers in families, may be not of genetic cause, but the result of common exposure to radiation, carcinogenic, and hormone disrupting chemicals. After all, environment is shared within families: neighborhood, housing, food, recreation, etc. Women were enrolled in the study if they had stopped taking either oral contraceptives or hormone replacement drugs for three months. What effect did the use of these hormonal drugs have on the outcome of the trial? Such questions as duration of use of either or both, level of hormone in the preparation, and exposure to other hormones such as in the diet of those who eat meat appear not to be part of the analysis. Despite the current alarming statistic that one in eight women in the United States, and one in ten in Canada, will develop breast cancer, it is necessary to understand that seven out of eight United States women will not develop cancer! Until connections to the environment and family history and breast cancer are fully investigated, the question remains: Is it ethical to give a carcinogenic chemical to seven women (as in seven-out-of-eight) who might never develop breast cancer in the first place?

DEVELOPMENT OF TAMOXIFEN
Tamoxifen was developed by London-based Imperial Chemical Industries (ICI), one of the world's largest and most successful multinational chemical corporations. Tamoxifen is dispensed as a small white tablet, displaying an impression of a woman's head on one side. Chemically, tamoxifen is a member of the stilbene or substituted-diethylene family, differing little from its chemical cousins diethylstilbestrol (DES) and clomiphene, known to be structurally related by ICI scientists. Its structural relationship to DES demonstrates a story difficult to put in words.

Tamoxifen has three phenyl rings, instead of the two rings found in DES, as noted in Figure 9.1. The structural relationship of tamoxifen to DES is critical. It was DES that caused genital cancers in the daughters of women who were prescribed DES in a misguided effort to prevent miscarriages. Two decades ago, tamoxifen and the pesticides DDT and methoxychlor were demonstrated to share similar biochemical action. Mounting evidence points to organic chemicals, similar to tamoxifen, that are linked to endocrine disruption and cancer.

These include some organochlorine pesticides, PCBs, and dioxins. Other Figure 9.1

Chemical structures of DES and tamoxifen. HO C = C OH CH 2 CH 2 CH 3 CH 3 DIETHYSTILBESTROL (DES) H 3 C H H N C C O
double-ring chemicals with a single rather than a double-carbon bond

produce adverse effects upon reproduction and hormonal function and
demonstrate carcinogenicity.22-26 These findings have been known for nearly three decades. The ability of DES to cause cancer was known before tamoxifen was patented and certainly before tamoxifen was developed on a commercial scale. 27 31 Moreover, Zeneca Corporation’s Dear Doctor letter stated: "In rodent models of fetal reproductive tract development, tamoxifen ... caused changes in both sexes that are similar to those caused by ... diethylstilbestrol," reiterating what had been reported previously,32 As early as 1967, ICI scientists wrote that "tamoxifen persists for some days in the uterus." In rats, a tamoxifen metabolite was found to influence the translocation of the estrogen receptor to the uterine nucleus. ICI scientists found the antiestrogen action of tamoxifen was related to its ability33 to bind to estrogen receptors, with "metabolite-B" (more similar in structure to DES), having greater binding ability. Tamoxifen stimulates hypertrophy of the lining of the uterus,34 In one study, women treated with tamoxifen for over two years had fewer new breast cancers, but an increase in uterine
cancer. An Israeli study of 175 post-menopausal breast cancer patients who received continuous tamoxifen therapy found 8.1% developed uterine polyps, 57.2% had atrophic endometrium, and 35.7% had coexisting hyperplasia of the lining of the uterus. Not only the use of tamoxifen, but age and hormonal status of a woman may influence the development of uterine cancer. In women who started tamoxifen therapy many years after menopause, there was an estrogenic effect on the uterus, causing endometrial thickening, polyps, and atypical cells. For this reason, patients should be monitored by transvaginal ultrasound and Doppler imaging to detect early lesions. The paradoxical estrogenic/anti-estrogenic effects may occur because the binding of tamoxifen and its metabolites to the estrogen receptor fails to induce transcriptional activation of all elements in target genes, and thus becomes expressed as an estrogen antagonist (antiestrogen) in breast tissue, and estrogen agonist (similar to estrogen) in endometrial tissue. One-quarter of patients in the United Kingdom breast cancer prevention study had atypical endometrial hyperplasia and polyps. Fisher, the director of the United States trial, estimated the risk of endometrial cancer in women taking tamoxifen to be 1 to 2 per 1000 per year.
usual risk of so many cancers per 1 million population, the given risk of 1 to 2 per 1000 translates into 1000 to 2000 women with uterine cancer. To whom is this acceptable? Animal tests shows that tamoxifen had the ability to cause genetic damage in the livers of animals and in the protein extracts of human liver cells. Early development of tamoxifen was as a contraceptive, but it functioned actually as an abortant, preventing implantation of the fetus, analogous to a chemical IUD (intrauterine device), resulting in termination of pregnancy as tested in rats. And it was by no means 100% effective. Rats given from 0.3 to 2.4 times the human dose of tamoxifen developed genital changes in both sexes, similar to those caused by estradiol, ethinyl estradiol, and diethylstilbestrol (DES). Tamoxifen was promoted also to prevent osteoporosis, but that too has been disputed. Patients from a Danish Breast Cancer Cooperative Group were analyzed. Their study suggested "that tamoxifen does not seem to offer protection against fractures in old age and may even increase the risk of fractures at particular sites." The NCI release reported fewer fractures of the hip, wrist, and spine in the group taking tamoxifen. The incidence was 47 versus 71 in those not taking tamoxifen, but there is no information as to the
level of activity of each group. It appears premature to attribute this differ-
ence as a benefit to using tamoxifen. Athletic active women may have more
injuries than sedentary ones, who on the contrary are more likely to develop
osteoporosis. Given that pre-menopausal women taking tamoxifen are urged not to
take birth control pills for conception control, the specter of a child with
tamoxifen-induced birth defects or post-adolescent development of cancer
is a valid concern. Currently, the period of time for the expression of cancer
in post-adolescence has not been fully achieved for tamoxifen-exposed off
spring. Birth defects are reported in a child delivered of a woman who had
taken 20 mg daily of tamoxifen until 20 weeks gestation. The baby girl had
clitoral enlargement, a single urethra/vaginal opening, and fused labia. So As
if the cancer and birth defects associated with tamoxifen use were not of
sufficient concern, interference with immunological function has been
found in test animals. So Considering that an intact and well-functioning
immunological system is required to keep malignancy under control, this
effect may be of greater significance than we now appreciate. In pre-menopausal women, with or without breast cancer, administration
of tamoxifen resulted in elevated estradiol and prolactin
levels, while in post-menopausal breast cancer patients, tamoxifen was without effect.

Prolactin is a hormone normally released by the maternal pituitary gland at the time of birth to allow breast development and milk production for the suckling infant. Abnormal prolactin release has been correlated with a number of chemicals that act as promoters of breast cancer. This issue is discussed in Chapter 8 (Hormones Too). ICI-supported research continued and showed mixed actions: it had antiestrogenic effects in the rat, while acting as a potent estrogen in the mouse. 52

Tested again in rats, tamoxifen promoted hormone-independent mammary tumors.53 And, ICI research revealed liver carcinogenicity and both ovarian and testicular tumors in mice. 54 Some women develop mastalgia, more commonly called painful breasts, often associated with the normal swelling that occurs just prior to menstruation. Other than discomfort, it is not a serious disease, but various drug treatments have been suggested. Promoted in the mid 1980s to treat mastalgia, the author of a clinical study cautioned "administration of tamoxifen to a patient with undiagnosed malignancy could lead to the emergence of an endocrine unresponsive tumor."55
Thanks to data collected and analyzed by members of the National Women's Health Network (NWHN), there appears to have been a disregard or at least a glossing over of concerns about the toxicity of tamoxifen by those eager to obtain clinical trials. Network members, even before the clinical trials had begun, documented known risks associated with tamoxifen use: uterine cancer, increased blood clotting, impaired vision, and cataract formation. Unfortunately, there is no data base for women taking tamoxifen outside of the specific trials. There are reports that tamoxifen use is associated with damage to the eyes, including retinopathy, even at low dose and reported as early as 1983. In organ culture, tamoxifen blocked chloride channels in the lens of the eye. These channels are essential to maintain hydration and transmittance of light through the lens. This adverse effect is totally independent of estrogen receptor binding. In the spring of 1991, NCI announced that it was going ahead with a tamoxifen breast cancer "prevention" trial. NWHN representatives testified before FDA officials in an effort to persuade them to amend the protocol and address the hazards that had been observed. Three women...
testified on behalf of the network and stated specifically: "1) There are no

data on the safety of long-term use of tamoxifen in humans,
2) the animal

data are not comforting, 3) public health interventions
should be health

promoting or at least non-toxic."61 That the testimony came from eminently

qualified women, one a physician and a second who held a
Ph. D., did little

to stop the FDA. Following the April 1998 NCI press
releases, the NWHN remained "cau

tiously optimistic that tamoxifen may benefit women with
the BRCA gene

and other women at high risk of developing cancer. For
women without an

elevated risk of breast cancer, the benefits of tamoxifen
remain very ques

tionable."62 Whether the women who developed cancer tested
positive for

the breast cancer gene or not is unknown. It was not a
part of the study pro

tocol. The NWHN recommend regular exercise, and eating a
low-fat,

high-fiber diet rich in cruciferous vegetables, which not
only may be preven

tive, but carries no risk of adverse effects. When the
"prevention trial" consent form came out in January 1992, the

most up-to-date information concerning uterine cancer in
humans was not

included. This omission gave women the impression that
risks were low. Risk

of developing life-threatening blood clots were unreported,
and liver cancer, produced in rodents, was misrepresented. By June 1992, barely 2 months after the trials had started, more information emerged about liver damage in women taking tamoxifen. Later that summer, researchers published data showing eye damage in tamoxifen users.63 During the summer and fall of that year, the network cooperated with a Congressional committee as to problems with the adequacy of the consent form used in the trials. This investigation revealed that 68% of the forms either omitted or altered one or more key points from the NCI-approved model form. Some of the forms did not meet minimum legal requirements for informed consent. By October 1992, the findings were presented to then Director of NIH, Dr. Bernadine Healey, who defended the trial. But, by early 1993, reports emerged that women taking tamoxifen had developed endometrial and gastrointestinal cancers. In January 1994, reporters found that Dr. Fisher, based at the University of Pittsburgh and heading the project, had been aware of new endometrial cancers in breast cancer patients, and that several women had died as a result of these new cancers. One logical question is: Why weren’t regular and comprehensive gynecological examinations a required part of the NCI protocol from the start, given that 23 women had developed uterine cancer in an earlier
"B-14" tamoxifen study, managed by the same group (NSABP) that oversaw the NCI study?64

In the face of the human and animal findings, it is difficult to understand the rationale behind reluctance to recommend regular gynecological examination of women taking tamoxifen. 65 It is essential to understand that there is no official gynecological examination program in effect for women with breast cancer being treated with tamoxifen, as contrasted with those participating in the official study.

Likewise, there is no nationwide program to assemble and maintain records on women prescribed tamoxifen for treatment of breast cancer. Using data from the B-14 program that had demonstrated an increased endometrial cancer rate of 1.6/1000 in tamoxifen-treated women, it can be calculated that 8 times that, or 12.8 additional women, can be expected to develop gynecological cancer among the 8000 women treated with tamoxifen.

Is that hazard acceptable? Is the trial ethical, given that the original protocol neither specified nor provided funding for gynecological examinations?

Merely reporting vaginal bleeding to one's physician is insufficient: uterine malignancy may develop in the absence of overt bleeding. As of 1992, the NSABP Consent Form to be agreed to by women taking part in the trial stated: "Other medications and all
costs will be charged to me in the same fashion as if I were not part of this study. "66 In other words, this massive study and any complications are to be underwritten by insurance programs in general—that is, if a woman has insurance. And if a woman has no insurance, who will cover the costs? The public? Breast Cancer Action Group, based in San Francisco, published "Tamoxifen update: Debunking a wonder drug." Adverse effects from tamoxifen include: cancer, increased blood clotting, possible eye damage, liver damage, depression, memory loss, and fatigue. 67 The last may be the hardest to bear for a woman with cancer, already overburdened and stressed. Given the protocol's stated risks of 62 breast cancers prevented, while causing 38 uterine cancers, and three deaths due to blood clots in the lungs, does the arithmetic make sense? Sixty-two minus 38 uterine cancers, minus 3 blood clot deaths equals a net of 21. According to Michael DeGregorio at the University of Texas Health Science Center in San Antonio, the official study underestimates the chances of fatal blood clot by more than 2 112 times, and underestimates that of uterine cancer by 50%.68 The estimated risks are stated above. In actuality, the NCI results were 116
breast cancers, including 3 deaths in the tamoxifen group, and 213 breast
cancers and 8 deaths in the placebo group. For uterine
cancer, there were 33
women in the tamoxifen group versus 14 in controls; for
pulmonary
embolism there were 17 cases in the tamoxifen group versus
6 in the controls;
and for deep vein thrombosis, 30 women in the tamoxifen
group versus 19 in
the controls. For the last three life-threatening
illnesses, the occurrence was
80 in the tamoxifen group versus 39 in the control group.
Can this be called
disease substitution?

ZENECA,ICI,AND CHEMICALS

Zeneca Corporation was a June 1993 creation of its parent
company ICI, one
of the world's largest chemical corporations. Zeneca is the
marketing agent
for tamoxifen, trade named Nolvadex. A mere 0.39% of
shareholders (1108
by number) held 82.1% of Zeneca stock. According to
corporate financial
reports, these few people owned between 50,001 to more
than 1 million
shares each. The boards of directors of both ICI and
Zeneca are each chaired
by Sir Denys Henderson, with nearly 10% of the stock in
Zeneca owned by
board members.69 This concentration of decision-making
power is made
graphic by a 1993 Zeneca Annual Report photograph of the board of directors, which shows 11 figures in nearly identical dark suits, with a lone woman director, also wearing the dark suit "uniform." From 1992 to 1993, Zeneca, the new subsidiary of ICI, showed a 42% increase in "profit before exceptional items and taxation." Pharmaceutical and agrochemical chemicals accounted for 42% and 33% of its 1993 business.

In its "current sales range" of pharmaceuticals for cancer are Nolvadex, its trade name for tamoxifen, and Zoladex (goserelin). The first is prescribed to women with breast cancer, the latter, an inhibitor of pituitary sex hormone release, is prescribed to men with prostate cancer. Eight additional chemicals mentioned under the category of "cancer" are not fully identified, listed as they are by trade name and code numbers. Zeneca, fourth in world sales of agricultural chemicals, awarded Cambridge University's chemistry department U. S. $1.9 million over 5 years to discover new compounds, primarily for its pharmaceutical and agrochemical businesses.71 Zeneca has teamed up with California-based DNA Plant Technology to develop gene technology to produce a "better banana."72 On another level, is Zeneca’s purchase of Salick Health Care Inc., a chain of 11 cancer treatment centers, worth $438 million. Los Angeles-based Salick
Health Care runs the largest for-profit cancer clinic chain in the United States.7 3

Zeneca spokesman David Barnes said "The prime motive is that this takes us into disease management as opposed to selling pharmaceutical products." A month's supply of 60 tamoxifen 10-mg tablets is priced in the United States at $78.99 and in Yugoslavia $23.33. From a commercial pharmacy in Canada7 5 the same supply can be bought for $17.81. Those prices are for the generic product. Nolvadex, the Zeneca name-brand product, costs $85.99 for a 1 month's supply in the United States. Now the most widely prescribed cancer medication in the world, it generated in 1992 revenues in the United States of $265 million.7 6 Worldwide sales of Nolvadex reached $400 million by 1993, and by 1997, revenues were $500,000,000, about half of which came from sales to women in the United States. Over the April 1998 weekend when the NCI tamoxifen study results were publicized, Zeneca stock rose from $137.25 to $147.00.7 7 How smoothly the names Nolvadex and Zoladex roll off the tongue ... soothing, nonthreatening sounds .... And Evista, the next estrogen-blocking drug to be tested, manufactured by Eli Lilly. Contrast the sound of those names with the names from Zeneca's agrochemical division, the herbicides,
which account for over 50% of that division's sales: Eradicane, Sutan, Mikado, Fusilade, Grasp, Achieve, Boxer, Touchdown, Devrinol, and Racer.

The insecticides include such aggressive names as Force, Dyfonate, Ambush, Karate, and Cymbush. The creative fungicide names include Anvil, Nimrod, Impact, and Captan. As long ago as 1977, Capt an was under review by the U.S. EPA when studies showed Capt an caused cancer and birth defects and produced both metagenic and chromosomal damage.7 8 ,79 Zeneca's herbi cide, Molinate, is under study in humans because of adverse reproductive effects in rodents.80 Not to be outdone in names is a product in Zeneca's Specialties Division, one called Deepshaft. See Table 9.1. An implied concern is that Zeneca, a corporate entity, may be manipulating the breast cancer message to divert attention from the issue that some of the chemicals it, and its corporate allies, produce may be contributing to the cancer epidemic. Realistically, with few exceptions, manufacture and promo145

| Table 9.1 |
| ZENECA AGRICULTURAL PRODUCTS |
| (Not all ZenecalICI products are included) Trade Name Generic Name Solubility |
| Herbicides: Eradicane Same Organics Sutan butylate organics Mikado unknown Fusilade fluazifop-p-ethyl unknown Grasp tralkoxydim organics Achieve same as Grasp |
Boxer pyrifenoxy organics Touchdown glyphosate-trimesium water Racer unknown Ordram molinate organics Insecticides: Force tefluthrin organics Ambush permethrin organics Karate lambda-cyhalothrin organics Cymbush cypermethrin organics Demon cypermethrin organics Lindane (patented 1940) organics Fungicides: Anvil hexaconazole organics Nimrod bupirimate organics Impact flutriafol organics Captan captan organics low in water A product of Zeneca's Specialties Division is called Deepshaft unknown unknown Solubility is indicated. Chemicals taken up by organic solvents indicate those that pass readily through the intact skin. Solubility in organic chemicals is also a measure of the ability of the product to partition into and be stored within fat portions of the body. tion of products, both therapeutic and causative of disease, are an integral part of nearly every major chemical corporation. ZenecaJICI is no exception. ICI/Zeneca's underwriting of Breast Cancer Awareness Month (BCAM) is complex. On the board of BCAM are persons from 13 institutions, including the National Cancer Institute, the American Cancer Society, Avon, Estee Lauder, and Hanes. S1 Zeneca contributed $600,000 to endow a professorship at the University of Pittsburgh, in honor of Dr. Bernard Fisher, director of the NSABP trials. In the United States, at least $60 million in tax funds have been awarded for the breast cancer prevention trial. These funds do not include expenditures of insurance costs or "other" medical aspects
of the trials that

may occur as a result of tamoxifen use. Early work on
tamoxifen was done by Craig Jordan, a pharmacologist

currently at Northwestern University in Evanston, Illinois.
His research,
supported by ICI, showed that tamoxifen did not destroy
all of the

hormone-dependent tumor cells. Jordan's test animals
demonstrated that

when tamoxifen "has been cleared from the rat and the

ormal cyclic hor

monal environment returns, the malignant cells are
reactivated and develop

into palpable tumors."82 A quote of Jordan in a 1994 issue
of Science

"Tamoxifen is the only thing we've got now for preventing
breast
cancer"-has been challenged by others concerned about
tamoxifen's

ability to damage DNA and cause mutations in the livers of
test animals. B3

What must be challenged also is the issue of ignoring
primary prevention. The National Women's Health Network,
concerned women, and numerous

physicians and scientists have raised significant concerns
that must be

addressed. The tamoxifen trial is unique: experimental
testing upon disease

free women in the face of known adverse effects that have
been demonstrated

in other women and in test animals. Heretofore, FDA has
required that drugs

be both efficacious and safe before being administered to
humans. And even
when a drug risked harm, it was considered appropriate to allow a drug
treatment only when the benefit outweighed the risk to the patient. In the

context of the tamoxifen trials, this is not treatment. Nor are the tamoxifen trials primary prevention: chemical castration is not

the same as primary prevention. [While castration refers specifically to males,

there is no comparable word for females.] Essentially, tamoxifen produces

chemical ablation of the ovaries, complete with the signs and symptoms of

menopause—not exactly a desirable situation in a woman under the age of

normal menopause especially if the antiestrogen effects include acceleration

of bone mineral loss and osteoporosis as some have found.

84 To date, no one

has suggested a parallel clinical trial on men, achieving hormonal ablation of

testicular function to “prevent” prostatic cancer. Have we progressed? If one has an estrogen-dependent breast cancer,

taking a pill twice a day is less physically traumatic than having one’s ovaries

surgically removed. But is it? If a woman may develop uterine cancer in

addition to breast cancer, can that woman withstand the additional disease,

the additional stress? The tamoxifen trial could very well become a disaster. The potential conse

quences are life-threatening. The very design, enrolling women at different
sites, overseen by many different physicians in different settings, from university centers to private practices, is fraught with record-keeping problems and lack of consistency from group to group. There is no assurance that each and every woman enrolled in the trial is receiving regular and adequate gynecological examinations, eye exams, liver function tests, and blood tests.

Ultimately, one must question whether experimentation with a toxic agent that may result in disease substitution rather than disease prevention is ethical. Of equal importance is the lack of uniform followup and recordkeeping for women taking tamoxifen for treatment of breast cancer. British scientists, also conducting tamoxifen trials, were critical of the decision to prematurely stop the United States study, citing too few women followed for too short a period of time, and the occurrence of serious side effects. Overall, only 57% of women were kept in the study for 4 or more years. Of these, but 3% were minority women. Some women, enrolled as late as September 1997, received either tamoxifen or a placebo for less than 6 months when the study ended. These factors will make any independent assessment very difficult. Interviewed after the study ended, some women
expressed their intention to immediately begin taking tamoxifen. With such

an indeterminate end for the study, adverse effects, including breast cancer,

developed by the women will be difficult to track and will simply melt into

the overall picture of ill health. The legal aspects of tamoxifen use alone are formidable, citing not only

ethics, but a human rights issue. Seattle attorney Leonard Schroeter, whose

comments before the House Subcommittee on Human Resources and

Intergovernmental Relations hearings were: "[A]ny person who is harmed ... [by] these trials without first having been fully informed of [tamoxifen's]

risks, most probably has an appropriate lawsuit against both the dispensing

doctor and the government.87 "Mr. Schroeter expressed concern that civil

rights violations continue to occur because of lack of informed consent,

giving examples ranging from the nuclear radiation experiments to current

drug tests and medical procedures. 88 He comes by his civil rights concerns

justly, having worked with Justice Thurgood Marshall on the school

desegregation issue following his graduation from Harvard Law School. Concern was echoed by then NIH director Bernadine Healey, who stated:

'We do not conduct trials without believing, based on scientific evidence, that

those [involved] will reap more benefits than undergo
In the context of the current antiregulatory climate, one may have a legitimate worry about oversight. Few are aware there is no overall policy at NIH to regulate oversight of clinical trials; some multicenter clinical trials sponsored by NIH do not include on-site data audits; audits of large trials under NCI are required only once every 3 years; and the FDA has no regulation stipulating that a study sponsor conduct regular on-site audits of trial data.

Clinical trials conducted by pharmaceutical corporations carry their own set of problems. These range from using multiple physicians (many with variable knowledge and experience, and some with no training at all in research procedures and overseeing clinical trials); to misinterpretation of data; to the question of outcome and ownership of data; to ignorance; to misrepresentation and fraud. These last two involved submission of fraudulent data to the NSABP by Dr. Roger Poisson from St. Luc Hospital in Montreal. The NCI has recommended that women who take tamoxifen to prevent the recurrence of cancer should not continue the drug for more than 5 years. In October 1998, the Food and Drug Administration approved tamoxifen use to reduce the incidence of breast cancer." Note, Zeneca was not allowed to use
the P-word, that is, prevention. What does this mean? Just how long should a woman without breast cancer take this drug? Will a theoretical decrease in breast cancer be offset by an increase in uterine cancer; blood clots leading to fatal pulmonary embolism; liver abnormalities and perhaps cancer; cataract and other eye changes; depression; and premature menopause? Who will know? Who is keeping track? It appears that no one is keeping track, which may be quite acceptable to some, for how will a woman be able to prove that her illness resulted from her use of tamoxifen if no data are collected. Although notification to discontinue tamoxifen after 5 years was sent to 22,000 physicians treating cancer patients, there is no indication that other physicians, noncancer specialists, prescribing tamoxifen for treatment or "prevention" were notified. As many as 20% of the 1 million women in the United States prescribed tamoxifen may have been taking the drug more than 5 years. The tamoxifen trials avoid the bigger issue: prevention of disease in the first place. In classical disease control, taught in schools of medicine and public health, prevention means removal or isolation of an inciting agent. These methods include such measures as sanitation to prevent contamination.
of a water supply; mandated pasteurization of milk to kill tuberculosis
bacillus; restricted use of liver-damaging carbon tetrachloride as a general solvent; and guard rails to prevent falls from high places.
In the case of breast cancer, prevention should take precedence, and that is to control and stop environmental pollution-both chemical and radiological. I urge the reader not to take my word on these issues, but to do your own research, and maintain a high level of suspicion. When asked if women should take tamoxifen based upon the breast cancer trial results, the answer from NCI is "The decision to take tamoxifen is an individual one in which the benefits and risks of the therapy must be considered." Does this not sound like the Premarin message, placing a medical decision on the women, few of whom have sufficient scientific background to make an informed decision? Why is our primary, well-funded National Cancer Institute not devoting its efforts to primary prevention? Has breast cancer, like so many aspects of our culture, become just another business opportunity? From the time of Hippocrates, the aim of medicine has been to place caution first and "do no harm." Such costly ventures as promoting drugs to block hormones in healthy women diverts attention, scarce resources, and funding away from preventing cancer in the first place.


35. Fornander, T., Rutqvist, L. E., Cedarmark, B., Glas,


44. Mani, c., Kupfer, D. Cytochrome P-450 mediated action and irreversible binding of the antiestrogen tamoxifen to proteins in rat and human liver: possible involvement of


56. Information about this and other advocacy groups is listed in Chapter 17.


75. WalMart Pharmacy, Kingston, Ontario.


81. It was Lauder's division, Origins, that supplied the chemically laden cosmetic "gift" at a Breast Cancer Awareness luncheon.


85. Fugh-Berman, A., Epstein, S. Tamoxifen: disease


10 POST-MENOPAUSAL HORMONE REPLACEMENT


We are so curiously made that one atom put in the wrong place in our original structure will often make us unhappy for life -William Godwin (1756-1836)

I had initially thought this chapter should be called, Aladdin's genie. Genie brings to mind a guardian deity, but unfortunately genie has an alternative meaning, and that is demon. The genie of discovery, the manipulator and controller of genetic information (same word derivation) we find has been liberated! Humans and the environment are in peril, and this is no Aladdin fantasy. Dolly, the cloned sheep, was hyped by the media, and some have plans to clone humans. The ramifications of genetic science, known, and
more ominously, unknown, bear careful scrutiny.

What can women expect from genetic research—the topic talked about on every media outlet? An article in the Journal of the American Medical Association discusses gene tests and cancer, diagnosis, measurement of tumor progression, therapy, and drugs. At no place in this article on the "cancer revolution" is primary prevention mentioned. What can we expect?

Little, unless we demand specific action.

This exploding field of gene manipulation was proclaimed on the cover of the final 1993 issue of Science, the journal of the American Association for the Advancement of Science. It named "p53, the Molecule of the Year," touting it the "genetic key to cancer." Tribute to this life-sustaining factor was repeated in the same journal a year later, announcing "DNA Repair Molecule of the Year."3

Sorely misunderstood by being linked to cancer, p53 is not the cause of cancer. No, p53 is a normal and necessary component of life. Its function is to suppress tumor formation. p53 must be intact and functional, not injured, to be able to perform its intended protective function, and if it is damaged, it
will not work as it is intended.

If the primary aim of genetic research is to prevent cancer, it is essential to link gene abnormalities to cancer-causing agents. Without identification of various carcinogenic stimuli capable of setting in motion the dysfunction of the p53 gene, it is unlikely that the "magic bullet" of gene identification for cancer will be more than an expensive laboratory technique.

Nearly 100% of genetic mutations are called "mis-sense"-damage that results in alteration of a gene that codes for a single amino acid. In other words, the message no longer makes sense, and the resultant "non-sense" must not be regarded as "harm-less."

About half of all cancers, including breast cancers, show mutations in the p53 gene. But mutations of the p53 gene differ with different cancer sites, and mutations are not constant even for cancers of a single organ. For example, people in China with liver cancer showed an entirely different p53 gene pattern from those with the same cancer in the United States. This is undoubtedly due to differences in carcinogenic stimuli in these two very different countries. It is postulated in the case of liver cancer in China that the stimulus is a fungus, common in China, but rare in the...
United States. 5

Most mutations of the p53 gene occur in the fatty, called lipophilic, portion of the gene in a small area that binds to DNA. Because many carcinogens thought to be involved in breast and reproductive cancers are lipid-soluble, this mutational pattern strengthens the research link between exposure to such chemicals and cancer. One group of industrial chemicals, all fat-soluble, includes the hormone diethylstilbestrol (DES); many organochlorine pesticides such as chlordane, heptachlor, lindane, aldrin, dieldrin, kepone, DDT; the PCBs; dioxins and dibenzofurans. None of these chemicals is found naturally; all are man-made.

If we are to stop the chemical-cancer link, the type and frequency of gene mutations and body burden of carcinogenic chemicals must be documented. This carcinogen-specific research deserves at least as much effort and financial support as personal gene identification. Given the potential for profit from patented gene-testing, and the threat to the status quo if the chemical pollution-cancer link becomes documented, it is unlikely that the needed research will be undertaken unless there is concerted pressure to do so.

How do cancer mutations come about? Through interference
and damage
by chemicals and/or various forms of radiation. Some mutations are random
and a part of the normal evolutionary process that allows new genetic traits
to emerge. The amazing creatures of the Galapagos are examples of what
happens when genetic changes occur on an isolated island.
Much of the cancer epidemic of today is a result of increasing exposure to
chemical and radiation factors. Although many of us have genetic susceptibil
ity to one illness or another, a second triggering factor from the environment
is needed to make the abnormality or disease manifest. Allergies come to
mind: the susceptible individual can be symptom-free in the absence of the
offending agent, be it ragweed, penicillin, or a cat. Unfortunately, throughout
our common evolutionary history, we have not developed mechanisms to
respond to many novel, man-made, insults.
Genetic damage is common, judging by the fact that 90% of p53 damages
are "mis-sense" mutations, whereby the identity of a single amino acid is
changed. Mis-sense changes in p53 are two-edged: resulting in both loss of
tumor-suppressor activity and a gain of carcinogenic function.? It is the tumor
suppressor activity that is protective.
Since these mutations occur only after the time of conception and birth, if we were able to test an individual on a daily basis, there would be a day when that person's genetic makeup would be transformed from normal to abnormal. What would be the event or events to cause that remarkable change? At which point in time, on which gene, on which chromosome, and on how many other genes would a change be found? The enormity of identifying that single genetic change from normal to abnormal would make easy finding a needle in a haystack.

What sets those "random" events into motion? Oncogenes operate in all animals, human and nonhuman. All chemicals known to cause cancer in humans cause cancer in animals, without exception. We can look at the following sentence and see how a simple alteration changes meaning, and thus the message:

SHE BROUGHT COURAGE TO SKILL AND HER REASONS.

SHE BROUGHT

SHE BROUGHT

SHE BROUGHT

SHE BROUGHT RAGE TO SKILL AND HER REASONS. RAGE TO KILL AND HER REASONS. RAGE TO KILL HER REASONS. HER SON. 165

In just four steps we have transformed a positive and
benign statement into a

deadly, malignant one. An alteration in a letter, word, sentence, paragraph, or

page of text results in garbled, misleading, false, or harmful information. In

the same manner, a mutation that is an alteration in a few genes changes the

very function and meaning of life.

The article "A strong candidate for the breast and ovarian cancer suscepti

bility gene BRCA1" received major media attention. It lists the name of 45

authors, and carries an important sentence: "It will be of utmost importance in

future studies to identify other genetic factors or environmental factors that

may ameliorate the effects of BRCA1 mutations."8 A companion piece in the

same journal concluded: "These results suggest that mutation of BRCA1 may

not be critical in the development of the majority of breast cancers that arises

in the absence of a mutant germline allele."9 Unfortunately, since those papers

were released, the press has carried precious little information about other

genetic or environmental factors that surely are a part of the breast cancer epi

demic. Rather, the press and the scientific community have emphasized

genetic testing and genetic manipulation.

Work done largely at the University of Utah identified the location of the
now famous BRCA1 gene that is associated with an inherited form of breast
cancer. It was claimed that BRCA1 (BReast CAncer-I) is the gene
responsible for about 5% of the total breast cancer cases. This leaves
unaccounted for the 95% of women who develop breast cancer in the
absence of this genetic alteration. With the passage of time since the
announcement of the breast cancer gene by the Utah researchers, a number
of groups of women have been tested. Prevalence of the BRCA1 gene
ranged from zero% in black women and 3.3% in white women (each group
ages 20 to 74) at time of diagnosis, to 33.3% in a high-risk family, defined as
the patient having four or more family members with breast or ovarian
cancer. The researchers conclude that for the general United States
population, widespread screening was not warranted.
A second study found that a large proportion of women with a family history of a first
degree relative with breast cancer and women diagnosed as having breast
cancer before age 35 years did not carry germline BRCA1 mutations, nor
was there a common family history profile among women who did have
BRCA1 germline mutations. If we use the 1994 estimate for
approximately

182,000 women who will be diagnosed with breast cancer each year, fewer

than 10,000 women will carry the mutated form of BRCA1.

Will emphasis

on this kind of research bring a reduction in breast cancer
to some 172,000

women without the breast cancer gene?

Screening for this gene (indeed, any gene linked to illness) raises implica
tions of enormous social and economic import. If a woman finds that her breast
cancer test is positive, will she be denied employment? Denied insurance? The

moral and ethical implications don't stop there.

The BRCA1 gene is a suppressor gene, meaning when it is functioning as

nature intended, it repairs damage to the DNA of a cell; thus in a way, it acts

like a brake on a car. When mutated, the altered gene allows for runaway
growth, just as when the brake on a vehicle is disabled, there may be uncon

trolled movement. Only the movement, in the case of the altered gene, may

be uncontrolled cell growth and spread, that is, cancer.

The Utah-based researchers identified the BRCA1 gene as having five
different sites where alterations have occurred. Alterations identified

include deletions, an addition, a substitution, an alteration, and a regulatory
mutation. Considering that a single gene mutation can result in a loss of a normal body function, five different alterations change not only the structure but the function of that single gene!

Considering the number and variety of changes in the suppressor gene, more than likely, not one, but a number of different insults caused these alterations. It is these insults, the causes of the genetic damage, that must be identified.

If you took your smoothly running automobile, deleted half of the spark plugs, added an anchor, substituted one of the wheels with a bicycle wheel, altered the fuel to kerosene, and changed the regulation of the carburetor,

your car would not function as intended. The same is true when a few genes are altered.

That the families from whom blood samples were collected lived in Utah raises some interesting questions. Mormon families can be useful for some genetic studies because many keep detailed, long-term genealogical records.

According to Dr. Mary-Claire King, blood was collected over a 20-year period beginning in 1976, though she believed that the genetic abnormality existed for a 100 years. In at least one family, the genotype of the grandfather was "deduced," rather than measured.
What were the stimuli that caused the genetic alterations, and when exactly did they begin? By 1976, when the blood collection began, the Utah population had been subjected to fallout from the Nevada test site for 25 years. A total of 26 aboveground tests and 11 underground tests had been detonated between 1951 and 1980, when testing was finally stopped. Dr. Carl Johnson found an excess incidence of cancer (61% for all ages) in Mormon families who lived in southwestern Utah and adjacent areas of Nevada and Arizona throughout the 1951 to 1962 period of bomb testing. By 1996, when the blood collection was complete for the gene identification study, 45 years had passed for cumulative radiation damage to occur. Did the genetic alterations occur over time, to a male or female progenitor, or to both, and when did they originate? We know that in the course of reproduction, each person inherits a copy of each gene from each parent. One gene could be a normal and thus a dominant copy, and the other a defective copy. It is plausible that in the absence of damaging radiation and chemical pollution, the gene's protective function would not have been as critical as it is today.

What are the insults that the defective copy cannot correct?
Considering the cancer clusters and the BRCA1 were identified in Utah,

did the genetic alterations result from various radioactive nucleotides, carried

from the Nevada test site, that rained down upon their homes and farms? We

do not know if the BRCA1 gene has been present for generations or not. Did

the Utah "clan of one-breasted women" suffer genetic damage from radia

tion as believed by Terry Tempest Williams and so lovingly described in her

book Refuge? In addition to radiation, what other gene-damaging stimuli

were active? Were the insults pesticides, used in homes and on farms, or were

they hormones, or hormone-like chemicals, contaminating the food, fish and

livestock of the Utah residents?

Two years after I wrote the above paragraph, I was given a copy of a

hearing held in 1959. Before we are led to believe that the breast cancer gene

is long-inherited, consider the implications of the following, which was known

by our Congress: "The genetic injury from both weapon-produced carbon-14

and fission products occurs at the moment the genetic molecule is affected and

is the result of absorbed radiation. The actual effect does not appear until this

particular gene is found in either the sperm or ovum at the time of fertiliza
tion. This event may occur several generations after the initial injury." Most of the injury due to fission products will be initiated within a 30-year period. By contrast, after the initial transient increase in atmospheric carbon-14 is past, half the remaining carbon-14 injuries will be introduced over a period of 5,600 years, 75 percent in 11,200 years, and so on."16 Why is this not well known to the gene researchers? Why is this not well known the bureaucrats at NCI who dole out the money for nearly every research proposal but radiation-induced genetic change? Who was it who said: "If we forget the lessons of history, we are forced to relive them"? Or should the quote end "forced to re-die them?"

Women are already having "prophylactic mastectomies" on the basis of a positive breast cancer gene test. What body part will we next be willing to excise, based upon genetic findings? Now that the nuclear genie is out, how can anyone claim that prophylactic mastectomies are prevention? Isn't primary prevention preferable—that is, to stop chemical pollution, stop nuclear bomb testing, close nuclear power plants, and clean up and control wastes?

What part each or all of these events played in altering the genetic base in BRCA1 is undetermined, and unasked. When in the course of
time did these
genetic variations appear, and did the genetic mutations
occur one at a time

or all at once?

The family identified to carry the BRCA1 gene had been
found in the Utah

Population Database as comprising a group of women with
pre-menopausal

breast cancer. As if breast cancer were not a sufficient
burden, women having

an altered BRCA1 gene were linked to a likelihood of
developing ovarian

cancer as well. The mutation was detected in 3 of 32 women
with breast cancer

and 1 of 12 women with ovarian cancer.!? 

The researchers collected blood from 195 family members,
and collected

information from 72 women via questionnaire or through
contact with living

relatives, recording reproductive history, cancer
incidence, treatment, and

lifestyle.1 8

The BRCA1 gene, located on a single chromosome, the one
designated as

17q, is about 10 times as large as an ordinary gene. Being
a large gene, BRCA1

presents a bigger target with more sites to be damaged,
and thus altered by

insults received in the course of a lifetime. The
researchers at the University of

Utah, where much of the work was done, found four different
mutations in
women from the eight families they studied.

For women concerned about the likelihood of developing breast cancer,

neither the BRCA1 test nor any other genetic test will be simple or inexpen-
sive. Accurately finding a unique mutation in the mass of the large gene will

not be simple. The task of comparing defective genes from different families

may prove to be even more elusive. Then, as if this were not a sufficient puzzle,

there is the suggestion of two additional genes, BRCA2 and BRCA3, not yet

fully identified, and still a third gene, the p53, which is also linked to breast

and other cancers. Lastly, some women have variations in their BRCA1 gene

and no breast cancer.

Work by biologist Ruth Sager, at the Dana-Faber Cancer Institute in

Boston, has identified more than 40 possible tumor-suppressor genes. So it

is apparent that a damaged gene, resulting in malignancy, is unique to neither

breast cancer nor to the much-touted BRCA genes.

In our technologically oriented society a quick fix is ever anticipated, and

prevention ignored. Soon after the initial announcement of the BRCA gene,

Ellen Goodman, on the editorial page of the Washington Post 20 wrote: "Today

we have an answer to a scientific puzzle that comes with a hundred new ques
tions. Just wait until they find the breast cancer gene. Now we wait for the
cure." Isn't the bigger challenge to stop the factors
damaging our genes?

This hoped-for panacea, a breast cancer gene, is a less
bright beacon than
touted in the media and by some scientists-anxious to
report a "break
through." Since gene mutations are multiple, and in
differing sites, a single
defect (and its single unique cause) will remain
undetected. More than likely
it is the sum total of various alterations that allow for
cell growth to go
unchecked. Left unaddressed by genetic research is the
question of primary
prevention, and the entire task of treatment of those
already sick.

How did this breast cancer gene research come about? It was
Dr. Mary-Claire
King, whose work at the University of California narrowed
the location of this
particular breast cancer gene to an area of 1000 or so
other genes, located in a
stretch of DNA on chromosome number-17, 21, 22 and it was
she who has called
for investigation of environmental factors leading to
alterations in this gene.

Following Dr. King's lead, Dr. Mark Skolnick and his
colleagues at the Utah
Medical Center in Salt Lake City used various techniques to
isolate the specific
gene. Upon submitting the group's findings for publication,
Dr. Skolnick said

they purposely omitted two critical pieces of information, for fear that the

information would get into the hands of the "competition."
But no cause for

alarm; the crucial sequences had been deposited with
GenBank and Myriad

Genetics, Inc., a Salt Lake City biotechnology company that applied for a

patent and has licensed the use of its genetic knowhow for the development of
drugs and diagnostic kits to a subsidiary of Eli Lilly.23,24 Eli Lilly Corporation is

a manufacturer of pharmaceuticals, chemicals, and pesticides. Six of the 45 sci

tists working on the project were supported by the National Institutes of

Health, bringing with them $2 million in federal funds. Eli Lilly contributed

another six scientists and $4 million, with product licensing then going to an Eli

Lilly subsidiary, Hybritech of San Diego. 25

One might question the wisdom, ethics, and economics of granting an

exclusive patent for a gene technology with such widespread public health

implications, especially when the research was supported by tax-derived

public money. The director of NIH, Harold Varmus, filed a counterapplication

for patent, adding claim for the government-supported NIH scientists to the

patent.2 6 A settlement was finally reached early in 1995,
granting 25% of potential royalties to the U.S. government (read, we the taxpayers). Kept con

fidential are the terms of the agreement between NIH, the University of

Utah, and Myriad Genetics, Inc, thus restricting access to information clearly

in the public’s interest. Shut out also is the ability of the NIH to set the price

of products developed under the patent.

The entire concept of allowing a corporation or any entity to patent

human genetic materials has not been resolved. Only France has declared

unpatentable "the human body, its elements and products as well as knowl

dge of the partial or total structure of a human gene."28

In an encouraging step, a number of scientists from the US., Norway, the Netherlands, and

England have formed the International BRCA Consortium (IBC) to share

data and laboratory materials regarding breast cancer genes. 29

Even in the absence of enormous ethical, moral, and economic considera

ations, impediment to the free flow of information and the assault on

human dignity can and should be what stops the patenting of human

 genetic material.

Granting Eli Lilly a patent on a breast cancer test may be the ultimate
irony: Eli Lilly is one of the purveyors of the cancer-causing chemical DES, and

until 1997, with Dow Chemical Co. a manufacturer of pesticides, some linked
to cancer, neurotoxicity, and hormonal effects. One of Lilly's most financially
successful chemicals is their mind-altering drug, Prozac,* perhaps the "soma"
of Huxley's Brave New World, touted to end our worries and concerns, but
paradoxically, linked to tumor promotion. Discussing the effect of Prozac and
similar chemicals on cancer growth, a major magazine article leads with "a
number of drugs are to cancer as gasoline is to fire."30

Other genetic research is controlled by another pharmaceutical/testing
giant: SmithKline Beecham, under contractual agreements with The Institute
for Genomic Research (TIGR), a nonprofit organization, and with the for
profit corporation, Human Genome Sciences, Inc. (HGS). Each is located in
suburban Maryland, close to Washington, D.C. 31 HGS will allow use of its
'Prozac (fluoxetine) is distributed by Dista Products Company, a division of Eli Lilly. The label,
printed in Physician's Desk Reference, lists 9 columns of information, warnings, and adverse effects
concerning the product.
proprietary data, but only after a researcher agrees to allow HGS first option
to license any useful products, and only after the researcher grants prior review of any publication. 32 As of 1994, HGS's founder, Craig Venter, held stock in his company valued at $11.5 million. 33 Within two weeks after the announcement of BRCAl, Eli Lilly announced an 8% increase in its third-quarter net income, to $3187 million, and SmithKline Beecham posted a 4% net increase, to $320 million, for the same period. 34

A parallel concern arises because SmithKline Beecham owns one of the country's largest clinical laboratory operations. When a physician submits a patient's blood (or any body fluid) sample to a SmithKline Beecham laboratory, the test results arrive at the physician's office on a computer-generated form. Considering conflicts between commercial and private interests, what safeguards are there that data will not be shared with other business interests? A bill to be sent to the U.S. Congress in 1998 would prohibit American companies from using genetic tests as a basis for firing or for employment benefits, and would bar discrimination against employees with genetic predispositions to a disease.

Will Jane Doe, with a diagnosis of breast cancer, become a "commercial
opportunity?" Will commercial exploitation be the least of Jane Doe's worries? Would this very personal (very, very personal) and unique information be used against a patient and her children? It takes but little imagination to picture a computer screen with one's genetic information available to anyone with the knowhow to access a data base: insurance companies, employers, persons involved in lawsuits.

Aspects of mankind slated to be tested or altered by genetic manipulation remain unknown outside of the scientists and corporations directing the research with little oversight by the public. While a proposal by National Institutes of Health director Harold Varmus to eliminate the genetics advisory board met with support from the biotechnology industry, opposition by the public ran two to one. A plan to shrink the Recombinant DNA Advisory Committee from 25 to 15 members, without regulatory power, was proposed.

At this time, ethical implications of genetic testing may far outweigh medical benefits. Drs. Li and Fraumeni of the National Cancer Institute call for adherence to the four ethical principles of respect: autonomy, beneficence, confidentiality, and justice. Autonomy implies true informed consent and
freedom from coercion; beneficence, the time-honored
principle of "first do
no harm"; confidentiality is straightforward; justice is a
tougher issue, requir
ing freedom from discrimination based upon test results,
and full access to
health care.

The United States is alone among first-world nations
without universal
medical care. With some 44 million citizens lacking access
to health care, it
remains a mystery why the collective public voice does not
demand universal,
single-payer medical care. Until this is achieved, the
medical care industry, as
it is currently structured, can and will be allowed to
discriminate. Freedom
from discrimination and access to patient-oriented health
care has become
less likely as insurance, corporate medical, and corporate
drug interests
assume control of medicine extending from basic research to
treatment. All
of this has been aided and abetted by Congress and
well-moneyed political
action committees

These critical issues, discussed by the scientific
community for some time,
go unaddressed by those whose lives are be most affected:
current and future
patients and their medical personnel. In the interim,
control of the issues run
full speed into the technological future. Without
single-payer medical care for all, the final factor, justice, may be the patient's greatest impediment to using genetic testing.

That genetic research has great commercial potential and significant power is not in dispute. A federal advisory board voted in September 1994 to allow scientists to bypass the NIH approval system and apply directly to the FDA to perform genetic experiments on humans. There is concern that experiments, previously prohibited on ethical grounds, may now be under taken. Such experiments include alteration of human genes that will be passed on to one's offspring. Under investigation also are some techniques aimed less toward disease amelioration than at cosmetic results, such as manipulating genes to increase a child's height, 37 Media attention to the breast cancer gene—from cover stories in mainstream magazines to articles in scientific journals—brings false hope to many women, and may well cost them considerable money in a futile quest. Lost in the message of the "cancer gene" is the more important fact that the gene is a repair gene. In other words, it is a gene that ought to repair cellular genetic damage, but, because it has been altered, it no longer functions as it was intended.
The prime issue is to identify what factors change a normal gene into a nonfunctional one. If our exposure to toxic chemicals and nuclear radiation were lessened, would the functional ability of protective genes be less critical?

And, shouldn't our financial and scientific priorities be more properly focused in those directions?

If BRCA1 screening becomes an accepted clinical test, then one can propose,

on the basis of scientific validity, fairness, and ethical concerns, that dual testing,

to assay for foreign, carcinogenic and hormonally active chemicals linked to breast cancer, be done on the same sample. If findings correlate, science will have made a major step in identifying chemicals associated with breast cancer,

and thus, a viable step toward prevention.

One expert rightly expressed concern for the cost of a dual, coordinated test. In view of the fact that the manufacturers and polluters that produced many of these hormonally active chemicals are clearly identified, would it not be equitable to place a tax on those corporations to pay for the assays? Such a program would go a long way toward defining the relative roles of genetics and environment: linking the tests makes scientific and economic sense and
could end the wrangling and deliberate obfuscation concerning what is a 
"risk" and what is a cause.

UNCERTAINTIES OF GENETIC TESTING

The announcement of BRCA1 brings questions galore:

• What if a woman finds she is carrying the BRCA1 gene? Can she lessen her chance of developing breast cancer by any means?

• If the woman elects to have a bilateral "prophylactic mastectomy," who will pay the cost?

• For concerned women, would any of the following be useful: Eliminate use of pesticides? Eat a vegetarian diet? Avoid use of birth control pills and post-menopausal hormones? Move away from the vicinity of an incinerator or nuclear reactor? Close the incinerator and nuclear reactor? Don't build an incinerator in the first place? Don't renew the license of a reactor?

• What of the 95%, estimated at 172,000, other women without a genetic predisposition?

• There has to be a cause of this epidemic, and if 95% is not genetic, it must be some other factor we share. What is that factor?

• Is there a link between BRCA1, breast cancer, genital cancer, even prostatic cancer, which is also on the rise?
• If BRCA1 testing is approved, will tests be paid for by insurance companies? By the Federal Government?

• Will the charge for genetic testing be based upon actual cost of development, or will a profit margin be factored in?

• If neither the insurance industry nor the government agrees to pay for such tests, will it mean that poor women and women without insurance will not be afforded the tests?

Until these concerns are answered, we must not allow technology to overwhelm valid scientific, social, ethical, and moral issues. Remembering the words of Martin Luther King, Jr., we may substitute the word genes for the word missiles, but the message remains the same: Our scientific power has outrun our spiritual power. We have guided missiles and misguided men. -Strength to Love


12. Personal communications. Dr. Mary-Claire King (1-26-95) and Dr. Michelle Bennett (1-18-95).


29. Ibid.


The old story about the drunk searching beneath a glowing street light for his lost car keys bears retelling. When asked why he wasn't searching across the street, closer to his car, he said “the light is better here.” It is becoming clear that much cancer research is conducted in the same way: not necessarily to find anything of significance, but that's where it's easier, and perhaps from the political point of view, safer as well. And of course, that's where the money is.

The Long Island Breast Cancer Study Project (LIBCSP) is a case in point.

In the late 1980s, women on Long Island became increasingly aware that their mothers, daughters, sisters, neighbors, and friends were being diagnosed with breast cancer. Asking why, one answer was that the cancers appeared to be
occurring in upper socioeconomic Jewish women; that must be the reason.

Needless to say this explanation was unsatisfactory to everyone: Jewish, non-Jewish, rich, poor, and middle class. Fortunately, the women came together, formed groups, and pressed for answers, ultimately getting the attention of Congress.

The LIBCSP was initiated by Congress in 1993. The Congressional Act directed the National Cancer Institute (NCI), in cooperation with the National Institute of Environmental Health Sciences (NIEHS), to "conduct a case-control study to assess biological markers of environmental and other potential risk factors contributing to the incidence of breast cancer" in women living on Long Island. Elements of the study were to include: "contaminated drinking water, sources of indoor and ambient air pollution, including emissions from aircraft, electromagnetic fields, pesticides and other toxic chemicals, hazardous and municipal waste, and, such factors as the director determines to be appropriate."

To date more than $19,000,000 has been appropriated to this project. The major portion, $7.36 million, has gone to Columbia University. Other players include Sloan-Kettering, that received $4.72 million; two awards totalling $4.28 million to the State University of New York (SUNY) at Stony Brook, Long Island; $1.2 million to the American Health
grants to Yale University, the Long Island Jewish Medical Center, and Cold Spring Harbor Laboratory.

In addition to the above main grant recipients, there are 32 subcontractors to the study. Major ones include personnel at Albert Einstein School of Medicine, Mt. Sinai School of Medicine, North Shore University Medical Center, University Medical Center at Stony Brook, Westat, Inc., and Winthrop University Hospital.

Given the way the UBCSP is organized and being conducted there are serious omissions:

1. Not addressing adverse effects from exposure to chemicals known to have been used on Long Island
2. Not addressing radiation exposures
3. Not addressing the additive and synergistic effects from exposures to multiple chemicals and multiple radiation emissions

Concern about a conflict of interest arose when SUNY Stony Brook, along with Battelle, were awarded a $2 billion, 5-year contract to operate Brookhaven National Laboratory, a major source of radioactive pollution for Long Island. How managers and researchers from SUNY resolved their conflicting interests remains unresolved.
Having so many players in any project has several potential effects: diffusion of responsibility and accountability; increased likelihood of error; and spreading the money thin. It has another, little noticed effect, that which operates so well for such commercial projects as B-2 bombers and nuclear reactors for China: it spreads wide the financial interest to keep a project going, no matter how useless, dangerous, or inept.

A separate $542,997 grant, originally given to Brookhaven National Laboratory, was rescinded. The plan was for scientists at BNL to study the "feasibility of a geographical information system." There was criticism on two counts: BNL is one of the major contaminating facilities on Long Island, raising the question of objectivity; Geographical Integrative System (GIS) techniques have already been demonstrated to be feasible, applicable, useful, and most importantly, already available. Automated systems have been developed to integrate census and topographic information. These can be combined with biological and environmental samples to pinpoint sources of pollution and resultant illnesses. What is more, much of the information is already in the public domain with data available on the
GIS techniques were clearly demonstrated by Colorado State University researcher Dr. Jay Nuckols, at an NCI seminar on the role of GIS-based techniques in cancer studies. I later met Dr. Nuckols at his laboratory at Colorado State University in Fort Collins. He demonstrated the GIS process as a "stack" of maps" overlain with different information. He showed how GIS methods can combine satellite images; census tract information; historical and current land-use data; location and path of water sources, incinerator and dumps sites; meteorological monitoring; birth, death, and sickness records; and combine them with computer storage programs to make essentially three-dimensional maps.

A less elegant technique of overlaying a map with see-through plastic pages of home sites and illnesses was used by Lois Gibbs and the residents of the Love Canal area and their scientific advisors. Using this technique and filling in data with color markers, Dr. Beverly Paigen and Dr. Marvin Schneiderman found that illnesses followed the path of swales, long covered over, but still transporting toxic chemicals.

The principal investigator for the LIBCSP is
epidemiologist Dr. Marilie Gammon. She estimated that approximately 2029 women will be diagnosed to have breast cancer during the 12-month recruitment period. Given an equal number of women to be included as controls, the total number of women in the study will be around 4100, which allots about $4634.15 for each woman.

The enormous cost of the LIBCSP is one factor of concern, but the decision to choose the control women from the Long Island population stretches all scientific credibility. In choosing control groups, whether humans for epidemiological studies or animals for laboratory studies, a control group is selected that does not have the exposure factor(s) under consideration. The stated purpose of the LIBCSP is to determine what unique factors on Long Island are resulting in cancer, not what is unique about the women developing cancer. If we live to the ripe old age of 85, one-in-eight of us will develop breast cancer in our lifetime. Given these odds, how can one be assured that of the 2000 control women, 8% or 160 women, don't already have undiagnosed cancer? After all, the control women have lived in the same milieu as the women with cancer.
Since learning of the unconventional choice of a control group, I have asked many different people, with and without scientific training, from where they would choose a control group to compare with Long Island. Without exception, no one chose Long Island. And more than one person remarked, incredulously, "not Long Island?!" But Dr. Gammon and her associates did.

It is true that our world is becoming increasingly contaminated, and as explained by Dr. Steingraber, "there remains no unexposed control population to whom cancer rates of exposed people can be compared. Moreover the exposures themselves are uncontrolled and multiple."6 Still, why did the NCI sponsored researchers set up the project this way? As the story unfolds, it will become more clear to the reader, as it has to many Long Island women, that the LIBCSP has serious, if not fatal, flaws.

The LIBCSP is conducted as a case-control study, that is, choosing a person without breast cancer to match with a woman who has breast cancer, taking into consideration such factors as age, race, etc. A case-control study is one of the most blunt of research instruments, especially given the way this one is being conducted, with cases and controls living in the same area. Given the
same level of funding, if the inappropriately chosen control subjects were not included, there would be over $9000 to do thorough biological and environmental testing for each and every woman with breast cancer.

Another issue of concern is who is eligible to be in the study. The study defines the participants as women "newly diagnosed with primary breast cancer, and whose physician has given consent for contact."? Some women feel that this arrangement was condescending and controlling, and wonder why the women were not recruited directly. There are 136 participating physicians, making patient enrollment cumbersome, variable, and incomplete.

The study design expects 1623 cases and the same number of controls to be interviewed. Of these, 60% "are expected to provide biological specimens," and approximately 325 of each group (650 total) who have resided 15 years or longer in their current residence will have home assessments of dust, drinking water, and soil. Of the 974 women with cancer (60% of 1623) who provide blood and urine specimens, fewer than half of the samples will be analyzed, the rest "banked for future use."8

The Long Island women have expressed serious concerns over the handling
of blood samples: insufficient quantities drawn; clotting of some samples; lack of coordination with environmental sampling; and samples obtained from women after radiation and/or chemotherapy treatment had begun. This last issue, comparing biological data from women without cancer to biological data obtained from women undergoing cancer treatment, is folly, and questionable science at best.

More numbers, and the numbers tell the story: 60% of the total number of women interviewed equals 1951, and 650 women are to have three different environmental assays, for a total of 1950 assays or a grand total of approximately 3900 biological and environmental samples to be analyzed.

The following is a direct quote as of December 1996: "That of the 650 participants (325 cases and 325 controls) with environmental samples, approximately 60 percent (n = 390) will have donated blood and urine specimens. Of that 390 (175 invasive cancer cases, 20 in situ cases, and 195 controls), about 40 percent (n = 148); 70 invasive cases and 78 controls) will be randomly selected for the lab assays of their blood and urine."9

Those are confusing numbers to comprehend, but if the numbers are correct, of some 1600 women who develop breast cancer...
During the period of study, roughly 4% can expect to have a full assay of both biological and environmental samples. Stated another way, after the expenditure of all the money, time, and effort, 96% of women will have no meaningful information.

For the rest of the participants, the study design gives no assurance that biological and environmental samples will be taken from the same woman.

Review of the "Results" portion of the "Background" document of Dr. Marilie Gammon's part of the study reveals another interesting point of view:

The very narrow approach taken to the issue of cancer-causing chemicals,

limiting the categories to "possible human breast carcinogens" and further

limiting the list to DDT, DDE, PCBs, and chlordane. Moreover, there is no provision to assay body fat samples for suspect chemicals.

Aside from being chlorinated organic chemicals with known toxic effects,

what do these chemicals have in common? These named chemicals have already been banned! That means no corporate entity will be embarrassed and on-the-line to stop production of any of the products in the United States. It also means that other carcinogenic and hormonally active chemi
cals, known to have been used on Long Island, are not under scrutiny in the Long Island breast cancer epidemic.

Citing lack of funds to include chemicals other than DDT, DDE, PCBs, and chlordane poses the question of whether this decision was to avoid offending a chemical manufacturer, supplier, or user of other candidate chemicals. Given that breast cancer is not the only cancer or the only serious medical problem on Long Island, this restricted view suggests a certain lack of perspective about connections between environmental factors, endocrine disruption, birth defects, other cancers, and other illnesses.

The scientific literature survey given in the "Background" document 11 shows a paucity of sources and a remarkable lack of historical information about chemical pesticides known to have been used on Long Island. Until the early 1970s there were 80,000 to 100,000 acres of potatoes grown on Long Island. Suffolk County was the third largest potato grower in the world, behind Maine and Idaho. Because of fear of a Colorado potato beetle infestation, pesticides were sprayed as often as every 10 days, from May to August. This was told to me by Dr. Robert Simon, who himself did spraying, applying Temik.
(aldicarb), dieldrin, endrin, chlordane, parathion, and DDT.12

Adding to Long Island's toxic chemical load were PCBs, which Dr. Simon related to have migrated from multiple sites, the major contributor being the General Electric (GE) plants near Fort Edwards and Hudson Falls, New York.13 By 1977, GE estimated there were 137 metric tons of PCBs on the river's floor,14 which has led to advisories against eating fish from the river.15

Flowing southward along the east border of New York state, the Hudson River is deceptively beautiful as it passes the state capital in Albany, the Roosevelt and Vanderbilt estates near Hyde Park, and further south, the West Point Military Academy. Near its mouth, the river flows by the west side of Manhattan and the borough of Brooklyn, which makes up the western end of Long Island.

So contaminated is the river that the federal government has designated the entire stretch of the Hudson River, downstream from the GE plant to New York Harbor, as a Superfund site.16

In addition to exposures from contaminated water and soil is the potential for even wider exposure as a result of air dispersion of PCBs. Citizens have voiced concern that delays in addressing the contamination
may have played

a factor in the transfer of Department of Health researcher Dr. Brian Bush.

Dr. Bush had been with the New York research post for 25 years when he was
told to "cease PCB analyses" immediately.17

In support of their decision to eliminate DBCp, toxaphene, and styrene

from testing, the Columbia researchers cited as "the most
comprehensive

source of information"18 documents prepared by
subcontractors of Agency

for Toxic Substances and Disease Registry (ATSDR) some time before

1990.19 21 By and large, ATSDR documents are not
historical compendia, but

reviews of relatively recent publications. The most recent
citation in the

styrene document was 1909, but even that publication cited
three studies that

were positive for mammary cancer in test animals.22

Dibromochloropropane

(DBCP) is a soil "sterilant" and is widely used in
agriculture. Though now

banned in the United States, DBCP remains detectable in
the water supply of

many communities. So far, this issue has been ignored.23

Dr. Gammon's memo that "no meaningful data has [sic] been published

with regard to the carcinogenicity of methoxychlor," and
regarding 2,4-D

and 2,4,5T, "there is insufficient evidence to conclude
that they are human
carcinogens" escapes credibility. The components of Agent Orange, 2,4
dichlorophenoxyacetic acid (2,4-D) and
2,4,5-trichlorophenoxyacetic acid
(2,4,5-T), were used extensively in agriculture, and while
2,4,5-T has been
largely banned in the United States, 2,4-D remains in
common use on lawns
and golf courses. Methoxychlor is similar in structure to
DDT and is documented to be carcinogenic. 25 Criticism of ATSDR and its
methods has been
documented in the publication Inconclusive by Design, the
last citation in
this chapter.
Long Island women have requested that dioxins be included
in the assays
because of known carcinogenicity and endocrine disruption
and the high
probability that dioxins, as well as the carcinogen
cadmium, are emitted from
incinerators located on Long Island. To date this valid
request has not been
done.
The considerable data on endocrine disruption, researched
by Dr. Theo
Colborn 26 and her associates, applicable to the cancer
problem for the
chemicals 2,4D, 2,4,5-T, atrazine, atrazine, endosulfan,
and alkyphenols, were
dismissed with the statement "no meaningful data exists
[sic] in regard to
their carcinogenicity, either in humans or animals."27 And so, these chemicals,

along with the phthalates and aldicarb also will not be looked for.

Why the decision was made not to assay for other chemicals is not known.

One would expect that simple curiosity would have driven a broader perspective. The women activists proposed more thorough chemical testing.

In response to their proposals, the researchers labeled their requests a "wish list," a condescending and dismissive reply to their legitimate concerns.

The soil-sampling plan and soil assay for polycyclic aromatic hydrocarbons (PAH) and nitro-PAH also pose problems for the LIBCSP participants. The original idea was to collect a single soil sample. Because this was inadequate,

the protocol was expanded to collect four samples-two samples from the yard, and two obtained within 15 inches or less from the house foundation.

The latter is thought to be where chemicals accumulate: chemicals such as paint components, termite and other pesticide treatments, and rainborne chemicals from roof runoff. The soil protocol says analysis "will be carried out on every fourth sample received, the remainder being stored frozen for later analysis if and when funds become available."28 The protocol does not state
which "every fourth sample" will be analyzed. Will it be a
sample from close to
a house, from the yard, where?

The soil collection data form asks for information on
herbicide and pesticide
use, but the protocol does not include analysis for
herbicides and pesticides.

No other assays are indicated, other than for polycyclic
aromatic hydrocar-
bons, the PAHs, and their nitrated relatives, the N-PAHs.

The entire soil assay problem begins with the method for
collecting the
soil. The protocol is illuminating. It says to put each
soil sample into a plastic
baggie, with a preprinted self-adhesive label, put two
rubber bands around
the baggie, and "place the four baggies next to each other,
and band them
together as well. Place the four banded baggies inside a
larger zip-lock bag"

with a pink laboratory copy form inside the last bag. The
soil samples are then
to be shipped with a frozen cold pack inside another
baggie, with newspaper
stuffed inside the packing box. Furthermore, the protocol
states that if
Federal Express is closed, to keep the samples "in your
refrigerator or
cooler."

Think about the above. Plastics leach into samples, samples
decrease in
amounts as they leach into plastics, rubber bands are made
of chemicals, self

stick labels are manufactured with chemical glues, newspaper ink has solvents

and other chemicals, the samples can be stored in a home refrigerator, and we
don't even know what's inside the cold pack! Is this any way to conduct

research? I've checked my own knowledge of soil chemistry with two indus

trial hygienists, and the word is glass. Yes, as with blood and urine samples,

soil samples must be collected and stored in tightly sealed glass to maintain

integrity of the samples and to avoid cross-contamination.

Why was this not known by officials at NCI and Columbia University and

by the people at American Health Foundation, where the assays are to be

done?

The carcinogenic effects from exposure to polynuclear aromatic hydrocar

bons (also called PAH's) have been known for decades. 29 These chemicals are

released from incinerators and various industrial operations. 3D One such

PAH is methylcholanthrene, having both estrogenic and carcinogenic proper

ties. When combined with x-ray exposure, PAHs caused leukemia in several

strains of mice. 31 On Long Island, such combined exposures, involving

multiple chemicals and nuclear radiation, is a reality. Why is this situation not
being addressed by the NCI-sponsored study?

A portion of the LIBCSP that follows sound scientific methodology and

procedure is the work of Drs. Bradlow and Kabat. Previous work by Drs.

Bradlow and Davis has demonstrated an increased risk for breast cancer with

alteration of the ration between 16-alpha and 2-hydroxyestrone, the metabo

lites of estrogens.3 Dr. Bradlow’s group is researching several common

pesticides that appear to increase production of the 16-alpha-hydroxysterone

as a link to breast cancer. It is likely that research directed to this problem may

produce some valid and useful results. Of the many shortcomings of the LIBCSp, perhaps the most serious is the

failure to collect data on nuclear radiation as a factor in the Long Island breast cancer epidemic. Extensive research links low-level radiation, alone

and combined with chemical exposure, to cancer. Unequivocally, Long Island is a place with a history of toxic chemical and radiation releases. In addition to the Brookhaven National Laboratory and

its nuclear facility. Long Island is in close proximity to the Millstone and

Haddam Neck reactors in Connecticut; the Indian Point reactor in Peekskill;

and downwind from New Jersey’s Oyster Creek reactor. Perhaps it is too

much for citizens to expect million dollar
governmental-sponsored multisite studies to provide either information or prevention. A case in point is the small, independent research group, Radiation and Public Health Project, Inc. (RPHP) headed by Dr. Jay Gould. Data collected by RPHP concerning radiation nationwide can be found on the internet at www.radiation.org. Dr. Gould and his associates accessed information from the New York Health Department's Statewide Planning and Resource Cooperative System (SPARCS). When they analyzed data for hospital discharges for breast malignancy for Suffolk County, the home of Brookhaven National Laboratory, they found that for the 1990 Suffolk population of 692,000 women, the rate of breast cancer for the county was 1.99 cases per 1000. This was somewhat higher than the corresponding rate of 1.91 cases per 1000 in New York City, and the nationwide rate of 1.7. In five zip code areas representing parts of five towns surrounding BNL, the breast cancer rate was 3.64 cases per 1000 population. They calculated that more than half of the female population of Suffolk county lives within a 20-mile radius of BNL. By dividing the circle into quadrants, they were able to add three other zones east and west of the circle to display the full variation in cancer discharges. The
highest breast cancer rate (4.0 per 1000) is found in women living on the north fork of Peconic Bay, downstream from BNL and only 11 miles down wind from the troubled Millstone nuclear reactors. To coordinate the findings of cancer and nuclear pollution in areas of Long Island and elsewhere, as Toms River, New Jersey, the RPHP has initiated the "Tooth Fairy Project" to collect baby teeth for measurement of strontium 90. By calling 1-800-582-3716, parents, teachers, and public health personnel can get instructions on how to send baby teeth for analysis. Perhaps the most critical aspect of the study is the realization that measuring levels of radionuclides in baby teeth gives irrefutable clinical and geographic evidence of prior contamination.

As if radiation pollution were not of sufficient concern, a 1996 survey of Peconic River silt found mercury and silver at levels more than 1000 times the criteria for the New York State Department of Environmental Conservation. Copper and lead were detected in seven of 12 samples of fish, and DDD, a metabolite of DDT and the PCB Aroclor-1254, was found in all four fish that were sampled. Additionally, tritium and cesium 137 were found in all
three samples analyzed for radionuclides. A 1998 survey of fish from the Peconic River, both on and off-site of the BNL property, found lead, mercury, nickel; the DDT metabolites DDE and DDT; and strontium 90 and cesium 137 in nearly all fish samples.

A New York Department of Health document calculated radiation doses for those who consumed fish, clams, or mussels harvested from Peconic River waters. "Due to the long residence within the body of Sr 90 and Cs 137, the radiation dose is delivered to body tissue over a long period of time [some 50 years] following ingestion."

These findings were reported in the press throughout 1997 and 1998.

Groundwater from BNL was contaminated with plutonium, uranium, americium, strontium, and cesium; tritium had been released into the air; plutonium from BNL had infiltrated the Peconic River, with measurable quantities 1 mile from the laboratory; and in 1996, radioactive cesium had been measured in deer living near the site.

Given the many surveys and historical data that have demonstrated significant chemical and radiological pollution on Long Island, and the avowed purpose of the NCI-Ied UBCSP to specifically address environmental factors
contributing to the high incidence of breast cancer on Long Island, the result of the research may be that the UBCSP will not find any connection between breast cancer and the environment. With its narrow, unimaginative approach, it appears it may discover little else of interest as well. Many on Long Island ask why research into factors causing breast cancer in Long Island women, as done by the NCI-sponsored, Columbia-led research, is being conducted in such an unfocused and incomplete manner. They ask too when all the time, money, and effort have been exhausted, will the UBCSP be another example of "Inconclusive by Design?"41


25. Sherman, I. D. Structure-activity relationships of


34. IT Corporation. Operable unit V-Fish tissue bioaccumulation study report. Submitted to Brookhaven National Laboratory Associated Universities, Inc. BLN Contract No. 710617. December 9, 1996.


In keeping with our increasingly polluted environment, it is now more common for men, along with women, to be diagnosed with breast cancer. The threats to life cut across the sexes, the miles, species, and centuries.

CANCER IN HISTORY

It was in males that the link between exposure to chemicals and cancer was first established. This observation occurred over 200 years ago, when in England, Sir Percival Pott described cancer of the scrotum in chimney sweeps. These victims were the poor, undernourished, small, young men and who did the dirty work of cleaning the insides of chimneys. The chemicals, clinging to the folds of their skin, induced cancers that spread through their genitalia into their abdomens, killing them. 2

While scrotal cancer is no longer common, due in part to...
fewer chimneys to
be cleaned and better access to soap and water, the
products of combustion,
the soot, tars, stilbenes, and polycyclic organic
chemicals, are still a part of our
environment and are still factors in the continuing cancer
epidemic.

MALE BREAST CANCER

Men are learning that breast cancer is not exclusively a
woman's disease.

Until recently, men's involvement in breast cancer has been
largely as
supporters of wives, mothers, and daughters as they battle
the surgical,

190

medical, and psychological burdens of the dreaded
diagnosis. Now, more

men are learning they too have breast cancer.
Increasingly, young boys are developing breast enlargement.
A reader's

inquiry about the problem to the Health Section of the
Washington Post was

answered by suggesting that the boy with breast enlargement
take a drug

such as tamoxifen or clomiphene, the latter a fertility
drug. In response to

the inquiry, no exploration of factors causing breast
enlargement for the boy

was offered. A boy with breast enlargement should have a
thorough medical
evaluation and should include inquiry into perinatal as
well as subsequent

exposure factors. The medical history should include diet,
such as meat and
dairy products, that may contain growth agents, and whether
the child
received a significant exposure to estrogenic hormones
prior to birth.

What lies ahead for these boys remains uncertain, for there
is no registry
to follow them. It would be prudent to obtain blood or fat
samples for assay
of chemicals known to have estrogenic effects. Will the
boys who develop
breast enlargement be the ones who later develop breast
cancer? Will these
boys have impaired fertility? These are issues ripe for
study.

The work of the Danish pediatric endocrinologist Niels
Skakkebaek is of
sufficient importance to the public to covered in the
popular press. In
researching endocrine-related abnormalities in young boys, Dr. Skakkebaek
learned that many hormonal products are used as growth
agents in livestock,
and that dairy cows are often milked while they are still
in calf, the period of
time when hormones levels are high. 4 A newspaper story of
a 38-year-old man with breast cancer raises troubling
questions. 5 After undergoing mastectomy, radiation, and
chemotherapy, he
was placed on tamoxifen. Within 3 weeks of taking the drug,
he reported a 20
pound weight gain. Considering that tamoxifen is not
directly anticarcin
ogenic, but has both estrogenic and antiestrogenic properties, is it an appropriate drug to give to a man? Of some 180,200 persons diagnosed with breast cancer this year, approximately 1,400 are men. Given that breast cancer is unusual in men, the male patients are an optimal group from whom to obtain full environmental and occupational assessments, and to do comprehensive fat assays for xenobiotic chemicals. Unfortunately, there is no known program in place. In 1980, I examined R.F., a 37-year-old man who had been diagnosed with breast cancer a year earlier. R.F. had worked in a tire manufacturing plant, where he was exposed to multiple chemicals, many carcinogenic and hormonally active. Although two of his coworkers had developed cancer—one with kidney cancer, the other with metastatic malignant melanoma—it was R.F. whose cancer site was the most uncommon. The carcinogenic hazards of the rubber industry are well characterized in a publication released nearly two decades ago by the International Agency for Research in Cancer. My own research on chemicals used in rubber manufacture revealed that stilbenes were a part of that chemical stew. Significantly, the biologically active stilbenes form the backbone of such products as stilbestrol, tamoxifen, and clomiphene.
Why should this be a surprise? Over a half-century ago, the link between stilbestrol and cancer was well established, producing testicular cancers in mice. 9 And earlier than that, the discoverer of diethylstilbestrol (DES), found low-order estrogenic properties in extracts of “peat, brown coal, lignite, coal tar, and petroleum,”10 as well as both estrogenic and carcinogenic properties in several polycyclic aromatic hydrocarbon chemicals (PAH).11 These findings are pertinent to both men and women, exposed as we are to these biologically active chemicals in our environment, work places, and food supply.

PROSTATE CANCER

Prostate cancer, like breast cancer, is also not an uncommon disease. In 1997, it was estimated that 317,000 men would be diagnosed with the disease and that 48,000 would die from it, affecting black males in greater numbers than their white brothers. Prostatic cancer has been linked to a variety of factors, including occupational exposure to cadmium, found in metal operations, some paint pigments, and welding. 12 Comparing areas with particulate air pollution, the mortality rate for prostatic cancer was 2.7 times higher in the most polluted zone, as compared to areas with fewer particulates. 13 A study of
15,000 white men found that those with a relatively elevated growth factor (IGF-1) in their blood were 4 times as likely to develop prostate cancer, furthering the concerns over the use of IGF-1 stimulating growth hormone (rBGH) in dairy cows. It has been asked: “If little boys drink milk from rBGH-treated cows over long periods, will the elevated levels of IGF-1 increase their prostate cancer rates?” The number of men affected with prostate cancer approaches the incidence of women with breast cancer, and the environmental links may well be the same: chemical carcinogens, endocrine disrupters, and radiation. In a recent study, Dr. Jay Gould utilized data from the Connecticut Cancer registry that, in 1945 before the onset of the nuclear age, was the only registry to keep records. He found that for men aged 50 to 74, the age-adjusted death rate from prostate cancer increased in the years from 1952-1956, during the time of aboveground nuclear testing. With cessation of the tests in 1963, the death rate leveled off until 1971. In the 22 years between 1971 to 1992, deaths increased from 20 to 27 per 100,000 men. More strikingly, in that same period, the incidence of prostate cancer per 100,000 men rose from 100 to 400. While some of the
increase may be
due in part to improved diagnostic methods, it remains that the increase is
real. Using Freedom of Information requests, Dr. Gould and his colleague,
Joseph Mangano, obtained raw data from the National Cancer Institute's
large data base, maintained since 1950 and arranged by state for some 3000
counties. They were able to calculate age-adjusted death rates for prostate
cancer across the United States. They compared rates from 1985-89 with
those of 1950-54 for 14 counties that were within a 50-to 100-mile radius of
six major nuclear facilities. These facilities were located in Hanford,
Washington; Oak Ridge, Tennessee; Idaho National Engineering, Idaho;
Savannah River, bordering on Georgia and South Carolina; Los Alamos,
Sandia, in New Mexico; and Brookhaven on Long Island in New York state.
Over that time span, while death rates across the United States increased
from 15.8 to 16.3 per 100,000 men, the rate for those 14 counties increased
from 14.9 to 17.8 per 100,000. More simply said, for the time period from
1950-54 to 1985-89 the prostate cancer death rate increased across the
United States by 3%, while in the 14 counties with nuclear facilities, the
increase was 19%. But it is not just this analysis that is important. The greater significance lies in the fact that the NCI data base was collected from every state department of health at a cost of billions of dollars, but never before published and made available to the public. Additional information, including tables with specific prostate cancer rates, arranged by state and county will soon be published in full and made available to all. A Prostate Cancer Prevention Trial (PCPT) has been proposed by the NCI, utilizing the anti-androgen drug finasteride. The plan is to enroll 18,000 men at 220 medical centers over a 10-year period to test finasteride against a placebo. Finasteride, known commercially as Proscar, is manufactured by Merck and acts to lower the hormone 5-alpha-dihydrotestosterone (DHT) via blocking the enzyme that converts testosterone to DHT. It is thought that both noncancerous and cancerous enlargement of the prostate may be controlled by this drug. It is unknown how many men will participate in such a prevention trial. A warning on the use of finasteride states: It is not known whether the amount of finasteride that could potentially be absorbed by a pregnant woman through either direct contact with crushed Proscar tablets or from the semen of a patient taking Proscar can adversely affect a developing male fetus .... Therefore because of the potential risk to a male fetus, a woman who is pregnant or who may become pregnant should not handle crushed Proscar tablets; in addition, when the patient's sexual partner is or may become pregnant, the patient should either avoid exposure of his partner to semen or he should discontinue Proscar.
Adverse effects in rats exposed in utero to finasteride included hypospadias (a split in the surface of the penis) in up to 100% of the offspring, decreased prostatic and seminal vesicular weights, and transient nipple development.1 9

In contrast to the thousands of women who allowed themselves to be recruited into the tamoxifen "prevention" breast cancer study, the study jointly run by the Department of Veteran’s Affairs and the National Cancer Institute to determine optimal treatment for men with prostate cancer, could not recruit a single volunteer at several centers, and found only 315 men at the Minnesota Veteran’s medical center. 20 The professed reasons were that the men did not want another person making decisions for them.

TESTICULAR DYSFUNCTION, MALFORMATIONS, AND CANCER

Environmental estrogens have been implicated in declining sperm counts worldwide. 21 Analysis of 14,947 men included in 61 papers published between 1938 and 1991 showed a significant decrease in both sperm count and seminal fluid volume. The authors discuss the significance of hormonal dysfunction with concomitant increase in testicular cancer, undescended testicles, and
abnormalities of the penis. 22 Congenital malformations of the genitalia were
3 times more common in men exposed in utero to DES than men in a control
group.23 The timing of exposures to environmental factors resulting in sperm
decline may be as critical as the chemicals themselves. One must consider
exposures occurring during prenatal life as well as subsequent exposures
from the diet, the environment, and ones’ occupation.
Between 1968 and 1993, the incidence of hypospadias doubled in the
United States. 24 Nine to 12 weeks after conception, as the male develops
inside the womb, the urethra, a channel for urine, develops in the penis.
Failure of this channel to close results in an open channel on the underside
of the penis, which may extend all the way to the scrotum. Genital, central nervous system, facial, and other defects in children
exposed before birth to the pesticide chlorpyrifos have been reported. 25 27
The defects are similar to those produced in test animals exposed to chlorpyrifos, a chlorinated organophosphate, and to trichloropyridinol, its
metabolic breakdown component,28-31
The incidence of testicular cancer is ominous. An extensive study of this
disease in six European countries demonstrates an increase in testicular
cancer in males born after 1920, leveling off during the years of the Second World War in Denmark, Norway, and Sweden, and increasing again in men born after 1945 in all six countries. These findings are indicative of environ mental factors, particularly chemicals carried in the food supply. "Diet" is often cited as the cause of a panoply of non-tobacco-related cancers, but the proponents of this theory fail to note that fat-containing foods are the carriers of fat-soluble toxic chemicals as well as nearly all radionuclides. During times of war, it is the meat, butter, and oils that are in short supply, shifting the food supply to grains and legumes. By 1965, compared to men born in 1905, the relative risk of developing testicular cancer had increased over baseline to 3.9 in Sweden and to 11.4 in the East German Democratic Republic.32 A previous study of the these six countries, plus the Baltic countries of Estonia, Latvia, and Lithuania, found similar increases3 That such a wide area was under consideration-Estonia, Latvia, Lithuania, Denmark, Norway, Sweden, East Germany, Finland, and Poland, all within the chemically and radiologically polluted Baltic and North Atlantic area-makes it impossible to dismiss the implications and significance of such findings.
Although testicular cancer accounts for fewer than 1% of all male cancer deaths, it accounts for 11 to 13% of deaths for males between the ages of 15 and 34. Even these statistics do not reveal the full extent of the problem, because testicular cancer, relatively easy to detect at an early stage, has a high cure rate. The incidence of testicular cancer doubled between 1937 and 1971, and is still increasing. Occupations specifically linked to testicular cancer are in agriculture, and oil and gas extraction. Testicular cancer in a group of aircraft repairmen and in tannery workers was hypothesized to have been caused by exposure to dimethylforamide, a chemical used in such work.

A conference held by the European Environment Agency (EEA) in December 1996 brought together governmental and chemical industry organizations to address chemical pollution and reproductive disorders. The conclusions of the EEA conference and those from a previous conference held by Theo Colborn and her associates bear attention and action. Spread across the globe are ominous findings for not only the human, but for the male of many species:

- Male fish have produced vitellogenin, a protein found normally only in
females.

- Turtles and alligators have been identified with reduced ability to mate due to abnormally small penises.
- Female snails and mussels, exposed to endocrine-disrupting chemicals, have transformed into males.
- Laboratory rats and hamsters, exposed to dioxins shortly before and after birth have reduced sperm counts.
- Rats exposed to PCBs prior to birth have disturbed thyroid function, and as a side-effect have small testicles and reduced sperm counts as adults.
- Early puberty has been produced in rats exposed to PCBs prior to birth.
- Birth defects of the penis (hypospadias) and undescended testicles have been produced in male rodents exposed to endocrine disrupting chemicals.

The EEA report specifically associates adverse effects in rodents with exposure to the pesticide Vinclozolin, patented in 1973 by BASF. In the United States, this fungicide with powerful antiandrogenic properties can be used on cucumbers, grapes, lettuce, onions, bell peppers, raspberries, strawberries, tomatoes, Belgian endive, and turf grasses. Describing how vinclozolin interferes with androgen-mediated sex
development, as well as interference by DOT and DOE, the authors state:

"Environmental chemicals with anti-androgenic activity offer profound implications with regard to recent clinical observations that suggest an increasing incidence of human male genital malformations, male infertility, and female breast cancer." 42 Three years earlier, researchers from this same laboratory found that pregnant rats, given vinclozolin, gave birth to males with abnormal genitalia. Findings included small and cleft penises, abnormal and undescended testicles, vaginal (female) pouches, atrophic seminal vesicles, and abnormally placed prostate glands. 43, 44 These researchers are from the Reproductive Toxicology Division of the U.S. EPA, the same agency that registers the use of vinclozolin. One must question why this product is on the market. Vinclozolin is but one pesticide registered by the U.S. EPA that has been found to have adverse effects upon reproduction and/or is a cause of cancer. The problems of pesticide registration in the United States have been well documented by Dr. John Wargo, in his book Our Children's Toxic Legacy How Science and Law Fail to Protect Us from Pesticides. 45 Citing EPA
examples that have failed to protect the health of United States citizens, he notes lesser developed countries lack even those provisions. In light of what is known about adverse effects, complacency seems to rule. There has been no march on the EPA or on Congress to err on the side of public safety. Abnormal sperm are found in farm workers who sprayed the herbicide 2,4-dichlorophenoxyacetic acid (2,4-D), resulting in both dead and abnormal sperm forms, raising the specter of birth defects in children conceived when these surviving sperm are active. 46 2,4-D is a weedkiller, commonly used on lawns, golf courses, and in agriculture. When mixed with the nearly identical chemical, containing one more chlorine atom, it becomes Agent Orange, the herbicide sprayed over Vietnam.

The use of chemicals with carcinogenic, sperm-damaging, antimale hormone actions on lawns, golf courses, and playing fields ought to give pause for anyone, child or adult. The joys and health benefits from exercise for children and adults alike should be available without being exposed to harmful chemicals. Of special interest to men, many of whom are golfers, is the use of so many toxic chemicals on golf courses. The U.S. Government Accounting Office (GAO) report of 1990 listed 34 major lawn "care" pesticides, many of
which lacked adequate assessments for toxic effects. Six---dichlorvos,
(DDV), maneb, benomyl, pronamide, 2,4-D, and
diazinon---were listed as
causing one or more of the following: cancer, birth
defects, interference with
reproduction, mutagenicity, and hazards to wildlife. 47

Two attorneys general from the state of New York have
issued reports on
the risk to groundwater from golf course pesticides. Nearly
20% of the
pesticides applied to golf courses on Long Island were
classified as possible
or probable carcinogens, and included propoxur, DDV, 
oryzalin,
trifluralin, fosetyl-AI, and chlorothalonil. There was one
overlap with the
GAO and New York state lists; thus, the number of
carcinogenic and
reproductive products according to those agencies increases
to 11. Four
common golf courses pesticides identified to cause
impairment of nervous
function are disulfoton, propoxur, thiram, and
chlorpyrifos. 48 A study of 686
deceased members of the Golf Course Superintendents
Association of
America, from all 50 states, showed elevated death for four
malignancies:
brain, non-Hodgkin's lymphoma, intestine, and prostate. 49

Chlorpyrifos, marketed as Dursban and other names, is one
of the most
commonly used organophosphate pesticides. I was among a
number of experts and victims invited to testify before the U.S. Senate as to the adverse effects from chlorpyrifos exposure. These effects included respiratory dysfunction, neurotoxicity, and birth defects. The testimony from all of the witnesses, as well Despite compelling information by myself and many others, a Senate bill to simply provide the public with information and notification of pesticide application never became law. 51 It would be in the best interests of all who participate in sports activities, adults and the parents of children who play sports, to document what chemicals have been used, and to demand chemically free activity areas. Ordinarily, worldwide, the number of male babies outnumbers females. In Denmark, there has been a change in the male-to-female ratio among new borns,52 suggesting that this deviation may reflect hormonal and chemical damage, either to the father's sperm or during intrauterine development. 53 Exposure to the agricultural product dibromochloropropane (DBCP) is a suspected agent because it causes depressed sperm counts and a relative increase in female children to be born to exposed fathers. 54 DBCP has been used as a chemical sterilant to combat nematodes and other
soil-dwelling species. Widely used in Hawaiian pineapple culture, DBCP has been found in the water supply long after use was discontinued.

Men and women together are suffering from cancer, linked by chemicals, radiation, economics, and politics. When one reads the names of corporate CEOs, their associates, and those on their boards of directors, one realizes that business decisions affecting the health of both men and women are being made primarily by men. Of the top Fortune-500 corporations, women hold but 643 of a total of 5438 seats. It is unknown if women in business will do a better job of promoting health and safety for all, but given the record to date, it would be worth a try to effect change. Lest I sound anti-male, I note that 1680 scientists, among them 104 Nobel prize recipients, both men and women, signed and published the "World Scientists' Warning to Humanity." Well worth reading, the document stresses that the health of all humanity depends upon stopping the current path of environmental degradation. If not reversed, the ultimate effects will be poverty, social unrest, economic decline, and ultimately, anarchy. Will it take a major restructuring of business, tax, and legal codes to force business decision-makers to give priority to health and
environmental protection above priority for "the bottom line"? Legal, political, economic, and ethical ramifications of corporate behavior are explored in various issues of Rachel's Environment & Health Weekly, published by Annapolis-based Environmental Research Foundation. The editor, Dr. Montague, writes: "The environment, democracy, civil society, and the economy are the same problem even though we [mistakenly] consider them separately." For two-and-a-quarter centuries, in a practically unbroken line, observant citizens and their physicians and scientists have made the connection between various illnesses and exposure to chemicals and ionizing radiation.

How much more information is required before prevention is demanded?

Can we unite, women and men, to prevent harm to our children and to their children, so that they will not face the needless suffering of cancer, and birth defects, and early death?

1. Pott, P. Chirurgical Observations relative to the Cataract, the Polypus of the Nose, the Cancer of the Scrotum, the different kinds of Ruptures and Mortification of the Toes and Feet. London. 1775.


730-731. April 1, 1967.


14, 1998.

17. Radiation and Health Project, 302 West 86th Street, Suite 11B, New York, NY 10024.


40. Bayrische Analine Soda Fabrik chemical company, established in Germany, with worldwide distribution and facilities.


46. Lerda, D., Rizzi, R. Study of reproductive function in persons occupational exposed to 2,4-dichlorophenoxyacetic acid (2,4-D). Mutation Red. 262: 47-50, 1991.


48. Abrams, Robert, Koppell, G. Oliver. (Separate terms
each) Toxic Fairways:

Risking Groundwater Contamination From Pesticides on Long Island Golf

Courses. New York State, Department of Law. 1994.

49. Kross, B. C., Burmeister, L. E, Ogilvie, L. K., Fuortes, L. J., Fu, C. M.


56. Full text available from: Union of Concerned Scientists. 2 Brattle Square, Cambridge, MA 02238. Single copies are free, 50 copies
cost $3.60.


11. Center for Health, Environment and Justice. PO Box 6006, Falls Church, VA 22040. 703-237-2249 e-mail: CCHW@essential.org web site: essential.org/cchw 15 THE CANCER MOVEMENT INDEPENDENT, SOLD OUT, OR BOUGHT Up? Break the Silence-Stop the Epidemic Open the Doors to Dialogue Around the World

That was the theme of the World Conference on Breast Cancer, held in July 1997, at the University of Kingston, Ontario, Canada. With few trappings, volunteers brought together women from 60 countries, who
with virtually a

single voice demanded action to stop the carnage.

I learned that the women of Kingston, Canada, like other
women living in

the Great Lakes Basin, have the second highest breast
cancer rate in North

America. Why? Kingston shares with other places on the
Great Lakes one

obvious thing: water. Kingston is a pretty city, situated
at the eastern end of

Lake Ontario, where the St. Lawrence River begins its
journey to the Atlantic.

Lake Ontario is last in the chain of the Great Lakes that
receive runoff from

the states of Minnesota, Wisconsin, Illinois, Indiana,
Michigan, Ohio,

Pennsylvania, and New York and from the Canadian Province
of Ontario.

Along the shores of the five Great Lakes are farms, power
plants, and indus

tries, adding pesticides, chemicals, incinerator emissions,
road runoff, fuels,
nuclear wastes, and sewage. There is little wonder that
this city, with the multi

tude of pollutants streaming by, is in the midst of a
cancer epidemic.

Needing to stop the epidemic, the women organized. They
were led by

founder-activist Janet Collins, and Karen Weisbaum, who
became president

216

of the organization. Janet Collins describes herself as a
"mouthy middle-aged
broad." She is outraged by the reluctance of the cancer establishment to speak of the causes cancer and to address prevention in a meaningful way.

The key organizers, 19 women and 1 man, are pictured in The Kingston Whig Standard, the local newspaper that lists the hundreds of volunteers and speakers who made possible the meeting. Against odds, these dedicated people conceived of, organized, and funded an extraordinary meeting.

They understood the pitfalls of relying on corporate sponsorship, in name and practice. Through very hard work, many small fund-raising projects, and keeping the conference modest in setting, the conference was able to foster independence, not beholden to any special interest.

Janet Collins related that during the early stages of organizing the First World Conference on Breast Cancer, they had no money and a telephone bill of some $2000. She turned down an offer of $75,000 from a drug company and a blank check from Dupont. This was at the time when the Canadian Cancer Society estimated that environmental pollution accounted for only about 2% of cancer. The conference accepted major support from Scotiabank and "WeDo" (Women's Environmental and Development Organization), and
hundreds of individuals and small independent entities.

WeDo was founded by Bela Abzug, the firebrand former member of the
U.S. House of Representatives. Ms. Abzug, a breast cancer survivor herself
and not physically well at the time, spoke eloquently of "a Global Nervous
Breakdown" and put the crisis in international public health as due to the
"malignant development" supporting our lifestyle. Her message was sup-
ported by the data on a one-page handout titled "Mother Earth is Sick."

Since one in every eight women will develop breast cancer in her lifetime,
and in the entire population, one in three of us will suffer from cancer in one
part of our body or another, why is there such complacency?

At the World Conference, international activist Judy Brady, writer and
editor of 1 in 3 Women with Cancer Confront an Epidemic 2 has some ideas.

Ms. Brady started out saying that most of us understand why cancer is increas-
ing: "most of us get it ... cancer is not our fault." She defined the collective
cancer establishment: the government agencies of NCI and NIH; the funds
receiving research universities; the ACS, a nongovernmental obedient agency
that speaks rarely of carcinogens; and the chemicalallpharmaceuticalallbiotech
industry. These businesses, hired and abetted by the public relations industry,
are the heart and brain of the cancer establishment.

Since 1971, when President Nixon declared war on cancer,
$1,000,000,000,000 have been spent, and there is no improvement in sight.

(That's 1 x 10 to the 12th power, a trillion hard-earned dollars!)

Asked why women are not rising up against these issues,
Ms. Brady cites economic and job insecurity; unwillingness to take a stand;
and the tendency to discount what we know to be true. As for the endless risk assessments under way, she calls them "liars for hire" and wonders how many people it is legal to harm or kill, citing the complicity of "mainstream science as the emperor's tailors." Judy Brady doesn't mince words: we need to listen and understand what she has to say.

One of the high points of the World Conference on Breast Cancer was an address by Sandra Steingraber, a poised and beautiful woman, poet, and holder of a Ph.D. At age 20, Dr. Steingraber learned she had bladder cancer. Since this is uncommon in women, nearly unheard of at that young age, and since she was a nonsmoker and nondrinker, she began to explore why. She learned she was not alone: beluga whales in the St. Lawrence
River have been identified with bladder cancer, and they too do not smoke or drink alcohol. And the whales, like the women of Kingston, Ontario, have breast cancer.

"We have a moral imperative to act in the face of inconclusive evidence," says Dr. Sandra Steingraber. Indeed!

Why this concept should be so opposed when it comes to public health is downright immoral. Nearly every other human endeavor is undertaken with incomplete information: bridges span crevasses; starwars weapons are developed; nuclear-containing rockets are shot into space.

Twenty years earlier, Dr. John Gofman said: "I am aware of no instance in the civilian economy where we take it as a premise that injury and murder of members of the public are to be regarded as beneficent acts.3 Yes, murder is the word he used. Think about it! If you or I cause harm, and are told we are causing harm, and don't stop, and it results in death of a person, wouldn't we be put in prison before we could blink an eye? Why have corporations been allowed to escape punishment for the harm they have caused? I mean punishment, not simply pay a fine that is tax deductible, or as it is termed: part of the costs of "doing business."
Self-interest alone dictates that preventing cancer should be the number one priority for all manner of reasons. We hear of thousands convening for the Promise Keepers meeting in 1997, and many more who showed up for the aptly named "Million Man March." And over 97,000 people convened on 219 the second Saturday in October 1997 to watch 22 men who ran, pushed, shoved, and huddled with one another, all for a ball at the Penn State Ohio State football game. On anyone night of a World's Series baseball game, some million people watch in rapt and supportive attention. What do these events have in common? They are well-organized and well financed. While the cancer treatment industry is well-organized and well-financed, activists, demanding prevention of cancer, find there is neither. What is lacking in money we do have: dedication. We need strong communication and organization. Breast cancer advocacy is springing up as a cottage industry. The groups and organizations serve as avenues for support, education, fund raising, and advocacy. Many groups offer needed emotional support to fellow sufferers. Women share their stories, concern about their treatments, their fears.
Concerned men receive training in support for their wives. Some groups offer education about treatment options, others offer an opportunity to contribute money and time for the sake of those who are ill and who have few resources for help.

There are several advocacy groups to be applauded: One is the Women's Community Cancer Project, a grassroots volunteer organization, based in Cambridge, Massachusetts. Aware of the environmental causes of cancer and the magnitude of the cancer epidemic, they say: "Women with cancer want the American Cancer Society to confront corporate polluters," rightfully proclaiming "early detection is no prevention." They rightfully emphasize: "Real prevention means not getting breast cancer to begin with."

Another group working on behalf of women is the National Women's Health Network, whose low-cost, easily read publications are straightforward, pointing out the fallacy of "early detection" versus primary prevention.

To their credit, members of this network were among those who testified about the hazards of the tamoxifen trials. However, sometimes these well-meaning groups unwittingly serve the interests of others.
The occasion was the Breast Cancer Awareness Awards luncheon, to honor four outstanding women whose efforts to stem the carnage of this disease deserved accolades. The setting, on a beautiful October day in 1994, was the ANA (All Nippon Airways) Hotel in Washington, D.C. Assembled in the ballroom were 500 well-attired women, all to raise money for the Betty Ford Comprehensive Breast Center at the nearby Columbia Hospital for Women.

First Lady Betty Ford and her contemporary Happy Rockefeller, each with breast cancer, were among the first women to bring into the open the issue of breast cancer. Thanks to them, it became acceptable to talk about breast cancer, to openly discuss mammography, to take away what had been portrayed as shame. Unfortunately, since their coming out, breast cancer incidence has increased 32%.

The artistically designed pink, mauve, and white luncheon program—a statement of refinement and elegance—states with justifiable pride: "Since 1990, nearly 4,000 procedures have been performed, free of charge, for women who would otherwise have had nowhere to turn for the care they needed." This Betty Ford Comprehensive Breast Center is a
place where

eligible women can receive screening mammograms at no cost, and where, if

needed, additional diagnostic mammograms, cyst aspiration, and stereotactic

biopsy have been made available. Approximately 167 such procedures were

provided to women in 1994. A worthy effort.

The women volunteers had raised $106,000 in 1994, earmarked to provide

service for the Low-Income Mammography Program at Columbia Hospital

for Women. Barbara Goodman, Co-chair of the Awards Committee, reported

the generous contributions of $35,000 from Mobil Corporation, and the

program noted contributions from three other benefactors: the Washington,

D.C. law firm of Williams and Connolly, the Wyeth-Ayerst Pharmaceutical

Corporation, as well as Avon cosmetics.

After the meeting, I called the hospital to find out how one became a

"benefactor." A woman told me that one is called benefactor by virtue of

giving $5000 or more to the program. Ms. Emerson, the woman who answered

my questions, said that gifts traditionally come as a result of friendships

between officers of the hospital and vendors. I asked her what she meant by

that, but she was reluctant to explain further.
She also said that in the past, Revlon had been a contributor of cosmetic favors for the luncheon, but this year, they were supplied by a different company, Origins. When I asked why cosmetics gifts were a part of the program at all, she replied that the attendees "expect them."

One wonders why any women at the luncheon, who was obviously able to pay her own, at minimum $50, luncheon tab and appeared able to purchase whatever cosmetic, shoes, or clothing she wanted, needs to expect a goodie at all. After all, cosmetic choice is such a personal decision.

Attendees each received a 3 by 4 inch magnetized plastic address reminder for the hospital, suitable for sticking to our refrigerator doors. We were given an Origins package, containing a half-ounce bottle of "Origins Sensory Therapy Peace of Mind-On-the Spot Relief" According to the carton, the Origins Commitment, is "Preservation of earth, animal, environment." A worthy goal.

Origins other goal is to sell products, and they do so by giving away free samples used to entice customers. It's more than a gift. It's a built-in opportunity to be on the "right" side of the issues and still make a profit. Origins is not alone.

The contents of the bottle, which we were advised to "breath in deeply,
massage a tiny dab into neck, temples, forehead, earlobes,"

were, among

many ingredients, the following: dimethacone copolyol,
poly glyceryl methacrylate, propylene glycol (used in
antifreeze), methyl gluceth-20, peg 7 and peg 150, butylene
glycol, imidazolidinyl urea, polysorbate 60, tea carbomer
934, dioctyl adipate, methyl, propyl and butyl paraban

Unequivocally, one must applaud the concerned and active
women who are

trying to stop the carnage of breast cancer and to give
support to those suf

fering with the disease. Understandably, cosmetics may ease
the change in

our appearance when we are sick, and as we undergo cancer
treatment. But,

without appearing cranky and mean-spirited, I believe that
before ending

breast cancer will be a reality, the economic connections
must not only be

understood, but addressed.

Let's take the last item first. It is apparent that the
synthetic chemicals in

the Sensory Therapy product are not needed, are possibly
harmful, and add to

the already overflowing burden of chemicals that surrounds
us. In addition, we

should even question the little vinyl refrigerator
advertisement-a plastic

made by the industrial use of chlorine, a chemical that is
basic to so much

industrial toxicity and a factor in some cancers. Whose
mother, sister, daughter

was needlessly exposed to these toxic chemicals when she
fabricated that
unnecessary piece of plastic in some factory? These workers were not the
women in attendance at that luncheon. A small note pad of non-chlorine
bleached paper with the hospital's address and phone number would have
been far more appropriate.

A sponsor, Wyeth-Ayerst, is a major purveyor of estrogens, namely,
Premarin. I hope the reader will read, and read carefully, the package insert,
and understand that Premarin may be one of the factors adding to our breast
cancer load.

As for the law firm listed in the program, Williams and Connolly, their
clients include General Electric, a defendant in a number of cases involving
damage from carcinogenic PCBs, radiation, and other contaminants. Williams
and Connolly waged an all-out campaign to stop the victims in a PCB contam
inated area from bringing their claims before a jury. Their attempt was reversed
by the Third Circuit Court of Appeals, for the second time, but not before some
of the residents died. In the field of breast disease, General Electric, the
company that "Brings Good Things to Life," may stand alone in its contribution
to a number of illness, including breast cancer. It is, in the words of INFACT, a
Boston, Massachusetts, consumer watchdog group, the company that is

"spreading a trail of radioactive and toxic contamination ... [and] has created

environmental health and safety nightmares across the country."6 INFACT also

reports that "time and time again, GE officials knew that dangerous waste was

leaving the Hanford site [home of a nuclear weapons development site] and

contaminating people, and that GE clearly understood that the health conse
quences could be severe. Yet GE never warned the area residents or GE's own

workers." And finally, the same report states: "GE ranks number one in

Superfund sites, being the 'potentially responsible party' at 51 sites as of

August, 1990. [It] also released more cancer-causing chemicals into the envi

ronment than any other U.S. company during 1988."7

As for the $35,000 benefactor, Mobil Oil, there's a story here too. Mobil, the

petrochemical giant, spent hundreds of thousands of dollars fighting its own sci

entists who warned of harm from its products. In 1990, a jury awarded Mobil

employee Valcar Bowman $375,000 in compensatory damages and $1 million in

punitive damages after he was fired for refusing to remove documents from the

corporations' Bakersfield, California, plastics facility to prevent the documents
In 1994, a jury awarded another Mobil scientist, Dr. Myron Mehlman, $7 million in lost salary and damages after Dr. Mehlman warned of dangerously high levels of the carcinogenic chemical benzene in its Japanese refinery. The Mobil attorneys appealed the jury decision, delaying relief to Dr. Mehlman.

On March 26, 1998, the Supreme Court of New Jersey, in an unprecedented ruling, upheld and affirmed the unanimous judgement of the Appellate Division. The opinion written by Supreme Court Justice 1. Stein for the majority of the Court says: The Conscientious Employee Protection Act . . . a "whistleblower statute" protects an employee from retaliatory action taken against him in New Jersey by his New Jersey employer because the employee objected to a practice that he reasonable believed was incompatible with clear mandate of public policy to protect the public health and safety of citizens of another Country.

The remainder of the decision also bears repeating: There is often very little that prevents industries from introducing toxic and poisonous chemicals and products into the environment. Legislation, written by or in cooperation with industry, cannot be expected to lean toward the best interests of the public and not of the industry. . . . Loyalties to the public and to the employer can be at odds, and the threat of retaliation can be severe and can carry the risk of economic, professional and personal ruin. Very few brave individuals will have the courage to risk their own and their family's well being, comfort, privacy and financial security to take the action necessary to protect the public good and prevent potential injury to huge numbers of people. Most find it easier to "look the other way" and not make waves. The New Jersey Supreme Court ruling in Mehlman v. Mobil Oil should encourage and provide the protection necessary for courageous individuals to speak out when chemical,
pharmaceutical, petrochemical and oil companies, nuclear facilities, waste disposal companies and others act or plan to act in a manner that poses serious danger to the public and the environment.

Mobil not only contributes to breast cancer groups, but it is the same company that "gives money to the Heritage Foundation, a right-wing think tank that has proposed opening designated federal wilderness to strip mining. Heritage has called upon conservative activists to 'strangle the environmental movement' and thereby put an end to 'the greatest single threat to the American economy.'

... ' Mobil [also] helps fund Citizens for the Environment, a Washington-based lobbying group that believes environmental problems would be solved if only corporations were deregulated.'

So much for sponsors and underwriters. Their financial support may be welcomed, but they have more than one side, and it is well to know with whom you ally yourself.

But back to the October luncheon. Looking at the women who attended the event, one must conclude that most are financially able, educated, and well-meaning. What is missing is knowledge of the issues; else why would one accept, without question, such a setup as that luncheon? When I tried to raise the issue of the causes of breast cancer with one of the physicians in atten
dance, I received only a polite nod. I tried on a one-to-one basis to stir up a conversation with several women wearing the identifying pink ribbon. I was successful with only one woman, Judy Ochs, who it turns out is a driving force in the Pennsylvania Breast Cancer Coalition. Judy told me she first found she had breast cancer when she was but 46 years old, and then, because of a series of medical mishaps, requested a second mastectomy. She had cancer in her remaining breast. Exceedingly bright, Judy has a sparkle, a sense of humor, and a sense of outrage about the breast cancer epidemic in her area. She told me that Pennsylvania has the fourth highest breast cancer rate in the nation. (New York, California, and Florida vie for top honors). Pennsylvania also has Three Mile Island nuclear plant, and the largest number of Superfund sites in the nation. Judy is particularly concerned about the number of women diagnosed with inflammatory breast cancer in the Lancaster area. Because inflammatory breast cancer is relatively uncommon and may be a marker for specific exposures, Judy has tried many avenues, without success, to get help to assess the women and their environment. Shortly after our meeting, Judy invited me to Lancaster to speak on toxic
chemicals and their connection to cancer. Later I spoke at the Pennsylvania Breast Cancer Coalition meeting in Harrisburg. As Judy and I were taking the elevator after the meeting, a friend of hers approached and said "Oh, you must be Dr. Sherman. Judy told me about you, but I decided not to come to your talk because I was afraid of what you would have to say." Judy is not afraid to hear about chemicals, radiation, and cancer: in fact, with her keen sense of reality and enthusiastic personality, she is a leading patient advocate for primary prevention. Understandably, after surgery and chemotherapy, Judy said she did not want to undergo any more procedures. But, over the next 5 years, doing her own extensive research online and in medical libraries, she determined she did want to have breast reconstruction; she determined what type to have; and who was the most likely surgeon to do it. My husband and I visited her in the hospital 2 days after her surgery, and the first thing she did was pull up her gown, and say "look at these fine hooters!" Judy is not simply a survivor, she is a thriver!

At the Breast Cancer Awareness awards luncheon, conversations were restrained, polite, and controlled. Real issues, involving pollution, carcinogens,
and prevention were avoided and, for those who are knowledgeable about the issues, the message of the luncheon was frustrating, despite the pleasure of honoring Dr. Devra Lee Davis for her significant contributions to awareness of cancer causation.

A prime example of corporate control is the annual October Breast Cancer Awareness Month (BCAM). According to "BCAM SCAM," an expose published in The Nation, the BCAM idea "was conceived and paid for by a British chemical company that both profits from this epidemic and may be contributing to its cause. Imperial Chemical Industries (ICI), along with two nonprofit groups, cofounded BCAM 9 years ago. The October event has grown in influence, with 13 institutions now on its board, which includes the American Cancer Society and the National Cancer Institute. BCAM has become fashionable too: Avon, Estee Lauder, and Hanes have lent sponsorship. But, since the beginning, all BCAM's bills have been paid by Zeneca Pharmaceuticals, the new name of ICI's United States subsidiary. Altogether, ICI has spent several million dollars on BCAM, according to [a] Zeneca spokeswoman." For this support, ICI can control the message: "Early detection is your best protection."
Janet Collins thinks the better message is "Prevention is your best protec
tion." We have no trouble accepting immunization for our children and thus
have decreased suffering and death from polio, whooping cough, tetanus,
diphtheria, and the like. Why do we accept less than true prevention when it
comes to cancer? Janet also says: "This practice of polluting corporations
recruiting women as their spokespeople drives me crazy. Not only do they get
to give the impression that they are equal opportunity and that women are
with them side-by-side in the march of progress, but the cowards get to hide
behind the skirts of women."13

Early detection is important, because like other cancers, breast cancer is
more curable before it has spread. But, detection is not prevention: ICI is in
the business of manufacturing and selling synthetic chemicals. With annual
sales well in excess of $18 billion, ICI is one of the world's largest producers
and users of chlorine.

And, as discussed earlier, ICI/Zeneca manufactures tamoxifen (brand
name is NOLVADEX), the world's top-selling cancer drug used for breast
cancer. Breast cancer activists must understand that what is good for a corpo
I attended the May 1994 National Breast Cancer Coalition (NBCC) meeting, billed as "Practical skills for political solutions." Speaker Tom Sheridan said: "Democracy is not a spectator sport-ask for accountability,"

and Congresswoman Marjorie Margoles Mezvinsky reminded us that after 451 years and a total of 3777 different members of Congress, only 163 had been women. The solution to stopping cancer lies in the political and economic area, not the medical. We already have more than enough information to take action.

The NBCC conference packet included a handout that under Prevention, stated: "Etiology: Must know the cause-not clear at this time." Listed under moderate risk were "upper socioeconomic status" and "significant radiation to the chest." Not defined was "significant" and completely absent was the issue of the more significant source of radiation, that of radioisotope contamination of ourselves and our food supply. Under "questionable" risks NBCC listed oral contraceptives and hormonal replacement therapy. Don't these leaders get it? Judy Brady got it, why don't they?

Can this lack of attention to toxic chemicals and nuclear radiation as
factors in causation of cancer be in any way connected to the sponsors listed on the program? These corporations are in the business of marketing chemi
cal products: cosmetics, solvents, plastics, pesticides, surfactants, and pharmaceuticals. Can activists expect that such companies will continue to back us if we advocate cutbacks in the use of chemicals if cutbacks reduce sales?

Clearly, accepting gifts and underwriting funds poses problems for the independence of the environmental groups. There was concern that because of pressure, and the difficulty of raising funds, the Kingston group who sponsored the First World Conference on Breast Cancer may not emphasize prevention when they next meet in the year 1999. Self-preservation alone demands a strong stance, but as they well know, not accepting gifts and underwriting poses problems as well, mostly the starvation of advocacy work. This year, Greenpeace closed offices and curtailed operations because of lack of money.

Sierra Club is in a similar situation, as is Environmental Health Network, the organization that researched and published Inconclusive By Design.

While advocacy groups are cutting back because of lack of funds, financial
support for groups such as the Center for Risk Analysis and the Health Policy

and Management Department, based at the Harvard School of Public

Health, is thriving. A partial list of donors includes the following: 14, 15

Aetna Life and Casualty Co.

ARCO Chemical Co.

Alcoa Foundation

American Automobile

Manufacturers Assoc.

American Crop Protection Assoc.

American Petroleum Institute

Ashland Oil, Inc.

Astra USA, Inc. Atlantic Richfield, Co. BASF Corp.

Bethlehem Steel Corp. Chemical Manufacturers Assoc.

Chevron Corp. CIBA-GEIGY Corp. Citco Petroleum Corp.

Coca-Cola Co. Cytec Industries, Inc. 227

Dow Chemical Co.

Dow Elanco (now Dow Agro)

Edison Electric

E.I. DuPont de Nemours & Co.

Eastman Chemical Co.

Electric Power Research Inst.

Exxon Corp.

Ford Motor Co. Fund

Frito-Lay, Inc.

General Electric Foundation
It is not illegal for a corporation to fund studies that are in its financial interest.

It is folly to underestimate such financial power, and imperative to document

and understand that kind of power. When Harvard University (and other similarly funded groups) releases policy and risk statements on environmental
and health issues, we must heed the advice: follow the money!

Breast Cancer Action (BCA) did,16 This advocacy group, based in San Francisco, stated: "Under no circumstances will policy or program decision be affected by the people or companies who donate support to the work of Breast Cancer Action. We cannot be bought, influenced or discouraged in our mission to eradicate breast cancer." As one of its guiding principles, "BCA advocates the precautionary principle of public health that calls for acting on the weight of evidence that links environmental carcinogens to breast cancer and other cancers, rather than waiting for absolute proof of cause and effect. Consistent with position, Breast Cancer Action will not knowingly accept funding from corporate entities whose products of manu-facturing processes directly endanger environmental and/or occupational health or may possibly contribute to cancer incidence, nor will Breast Cancer Action knowingly accept donations from corporate entities that work to weaken or circumvent environmental or occupational regulations that would protect the public health,"

Contrasted to the list of donors acceptable to the Harvard Center for
Risk Analysis, Breast Cancer Action made the policy decision not to accept contributions from the following categories:

1. Pharmaceutical companies
2. Chemical manufacturers
3. Oil companies
4. Tobacco companies
5. Health insurance organizations
6. Cancer treatment facilities

We certainly live in a unique time. Just a few years ago, one would have thought that advocates on behalf of health and prevention of cancer could embrace the support of pharmaceutical companies and cancer treatment facilities. Reflecting on the purpose of the corporation to sell products and services and maximize profits, it becomes apparent that prevention cannot be in the interest of the bottom line. What a sad and bitter realization.

The breast cancer issue has been adopted not only by pharmaceutical corporations, but by advertising for fashionable products and meetings. All the while, laws protecting polluters remain in place and the polluters co-opt advocacy groups. We must understand the false allure of the powerful and rich, of luncheon perks, and products that add to our contaminated lives. We
must understand the sources of authority in our culture, end naivete, take charge of our own lives, and raise our own funds by dint of our own labor.

Can we, as Breast Cancer Action did, learn to say, "No thank you" to tainted money? Even a small amount of tainted money? The $35,000 gift to the Breast Cancer Awareness luncheon donated by Mobil may sound like a lot, but it is less than one-half of 1% of only two jury judgements against Mobil. And that total does not count the money spent on attorneys, fighting citizen's concerns, and opposing concerned and honest scientists.

A look into the gift horse's mouth may reveal rotted teeth and very bad breath.


7. "Bringing GE to Light." A report, researched and
compiled by INFACT, Boston, MA, October, 1990.


THE CITIZEN CAN


