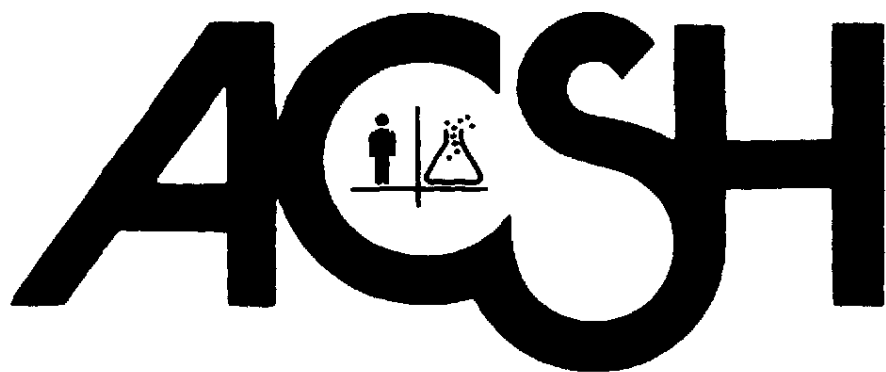




THE DDT DEBATE: THE BEGINNING OF THE BIG BAN ERA

by Helen E. Kelly

It has been incontrovertibly shown to prevent human illness on a scale hitherto achieved by no other public health measure entailing the use of a chemical.

*—British Medical Journal editorial
Chemicals used as sprays are like devils
that create chains of poison and death.*

—Justice William O. Douglas

Both of these allegations refer to the same substance. A paradox? Perhaps. A prototype for conflict? Absolutely.

The substance is DDT, and the statements above epitomize the heart of the battle over the banning of DDT, a battle that gave birth to and nurtured the environmental movement that is now in full bloom. The DDT controversy may seem like ancient environmental history today, but its form can be traced in virtually every environmental conflict since then. It is this role as prototype that makes the DDT debate so fascinating and so worthy of study. Now, almost two decades after the appearance of *Silent Spring*, environmental contests take the form of ritual drama, the script of which was written during the fight over an ordinary-looking white powder—dichloro diphenyl trichloroethane.

DDT was first synthesized in 1874, but 65 years passed before it was tested as an insecticide in 1939 in Switzerland. The following year, in 1940, it was patented as a contact insecticide by Dr. Paul Muller, who received the Nobel Prize in medicine in 1948 for his discovery.

DDT began its life of use as a public health insecticide during World War II. In 1943 the U.S. began manufacturing the chemical for military use in the fight against two devastating insect-borne diseases: typhus and malaria. General worldwide use of DDT began after 1945. At first the emphasis was still on the medical benefits of the insecticide, primarily in terms of malaria control, but also against the vectors of yellow fever, sleeping sickness, plague, typhus, dengue, and encephalitis, all of which are transmitted by insects. However, the low cost and wide effectiveness of DDT guaranteed that its use would be extended to pest control in agriculture and forestry. In



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many cases, the use of DDT greatly increased crop yields, as in the case of rice production in the Philippines, Thailand, and Venezuela. In the U.S., the greatest but by no means sole use of DDT was in the South, to combat the insect destroyers of cotton, peanuts, and soybeans. DDT was also found to be an effective agent against the spruce budworm, pine weevil, tussock moth, and gypsy moth, which have the capacity to devastate woodlands.

Since DDT was not the only insecticide available by the early 1950s, one might wonder why it continued to dominate the scene, especially for use in public health programs. There were three reasons why DDT remained the preferred insecticide for many uses, not the least of which was its extraordinarily low cost. In 1968 one pound of DDT cost 17½ cents. Since, for many purposes, the recommended application level of DDT was one pound per acre, enormous areas of land could be treated at a minimal expense. At the height of the DDT controversy it was generally acknowledged, even by opponents of DDT, that no available alternative could be obtained as cheaply.

The second reason for the overwhelming success of DDT was, ironically, the very property which was to become ammunition for those who sought to ban its use in the late 1960s, namely, the exceptional stability and persistence of DDT in the area sprayed. This ability of DDT to remain active for many months after application eliminated the need for frequent respraying. While this made DDT use efficient for both forestry and agriculture, it was in the area of malaria eradication that the persistence of the insecticide was most vital. In many cases, the areas to be sprayed were far removed from civilization and difficult to reach, and the need for constant respraying would have crippled anti-malaria programs. The long-term residual effect of DDT made it possible for long intervals to elapse between sprayings of dwellings. Without the advent of DDT or some other equally effective and persistent insecticide, it is dubious whether large-scale malaria eradication programs would ever have been attempted.

As it stands now, DDT has been credited with saving 100 million lives as a result of its use against insect-borne diseases. Some idea

(continued on page 13)

DR. JOHN HIGGINSON TALKS WITH ACSH

ACSH NEWS & VIEWS

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Environmental Update

John Higginson is the founding director of the World Health Organization's International Agency for Research on Cancer (IARC). Born in Belfast, Northern Ireland, in 1922, Dr. Higginson received his Medical Degree from Trinity College, Dublin, in 1946. Prior to joining IARC, Dr. Higginson was a research pathologist at the University of Glasgow and the South African Institute for Medical Research, Johannesburg, and later, American Cancer Society professor at the University of Kansas. He is widely recognized as one of the originators of the environmental theory of cancer causation.

ACSH:
WHAT ARE THE GOALS OF IARC?

HIGGINSON:
The IARC was established as a research institute by a group of governments to try to develop and execute a coordinated international program in cancer research with special emphasis on epidemiology, causation, and prevention.

ACSH:
HOW DO IARC'S RESEARCH AND PUBLIC EDUCATION PROJECTS DIFFER FROM THOSE OF OUR NATIONAL CANCER INSTITUTE OR THE AMERICAN CANCER SOCIETY?

HIGGINSON:
Although the budgets are very different (the Agency being a somewhat "peanut" operation), all nonetheless have the same goals in the field of environmental carcinogenesis. Because of our limited budget, however, the Agency has no clinical program and does not treat patients. The Agency is essentially a scientific research body, publishing in the scientific literature. The practical value to the general community comes from public health measures for prevention. These can be applied, as a result of that research, either through government action or through educational programs. For example, we can educate people about the carcinogenic dangers of excessive drinking.

ACSH:
IS CANCER A SERIOUS HEALTH PROBLEM WORLDWIDE?

HIGGINSON:
Well, the relative importance of cancer as a health problem keeps changing in different countries. Thus in the United States, about one in four persons will develop cancer today. These figures are similar to those in Western Europe and the Soviet Union.

In contrast, in the developing world, changes can take place extremely rapidly, as illustrated in the case of Singapore. Cancer was a relatively unimportant cause of death in Singapore in 1950. By 1965 it had become the most important cause of death on the island.

Later, it was overtaken by heart disease, which had previously been of less importance. This was possibly due to changing lifestyle conditions associated with increased prosperity. In India, the number of cancers is increasing markedly due to improved life expectancy. However, the relative importance of this increase is diminished by the large number of children and young people in that country. The importance of cancer will become more obvious as the population pyramid stabilizes as a result of birth control.

ACSH:
HOW DO YOU REACT TO THE SEEMINGLY ALARMIST REPORTS THAT THE UNITED STATES IS CURRENTLY EXPERIENCING A "CANCER EPIDEMIC"?

HIGGINSON:
I have discussed these reports with numerous epidemiologists. We are all agreed that there has been an epidemic of lung cancer related to cigarette smoking over the last two to three decades. This is partly offset by a marked decline in stomach cancer. For most other cancers, there are only slight trends up and down, which are difficult to evaluate due to registry artifacts, etc. As a generality, it could be stated that in the U.S. in whites, tobacco-related cancers are still increasing. In black males, there are marked increases in lung and esophageal cancers and some increases in prostatic cancer. In black females, lung cancer is increasing but others are decreasing. Some of these latter changes may be due to lifestyle factors. I do not believe that there is an epidemic, as is often implied, apart from lung.

ACSH:
THE AMERICAN ATTITUDE TOWARD CANCER IS CALLED BY SOME A "CANCER-PHOBIA"—IS IT UNIQUE TO THE UNITED STATES?

HIGGINSON:
I don't think it's unique to the United States. However, when you have a population where over 20-25 percent of the people get cancer, practically everyone has had personal contact with the disease. Thus, fear of cancer has largely replaced fear of tuberculosis (the white death, as it was known in the past). Naturally, people are very worried about a disease whose nature they do not understand. I think that vocal cancerphobia is probably more extreme in the U.S. than in other countries in the sense that people feel that few improvements have taken place in treatment and understanding of the disease. This attitude is partly media-engendered, and partly due to over-expectations as to the immediate results of modern research.

ACSH:
DO YOU THINK IT IS BECAUSE A "CURE" HAS NOT BEEN FOUND?

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HIGGINSON:

I think that there have been definite over-expectations as to the possibilities of an immediate cure, although many people believe that if enough money is spent, cancer can be prevented, controlled, and cured very soon. Unfortunately, people don't recognize how much in fact has been done, and how much could be done by applying available knowledge. For example, in the United States, if skin cancer is included, we probably could prevent nearly 40 percent of all cancers in males with certain changes in cultural habits and lifestyles. The proportion theoretically preventable in females is much smaller, say 20 percent. Unhappily, such changes often involve individual action which people don't want to carry out. This indicates the discrepancy which exists between a vague fear of an event in the long-term future, and a present pleasure, such as smoking. People's fears and their willingness to do something about those fears do not always operate rationally. So, cancer prevention should be considered in addition to gradual improvements in therapy. Certain skin cancers are deemed virtually 100 percent curable today.

ACSH:

IN ONE OF YOUR MANY ARTICLES YOU TALK ABOUT THE GENERAL UNWILLINGNESS OF GOVERNMENT TO APPLY CURRENT KNOWLEDGE OF CANCER RISKS WHERE IT OFTEN AFFECTS PERSONAL PLEASURES OR MATERIAL WELL-BEING. YET YOU ALSO STATE THAT IN SUCH CASES IT IS THE GOVERNMENT'S RESPONSIBILITY TO TAKE THE NECESSARY DRACONIAN MEASURES. IS THIS A SOLUTION OR A PARADOX?

HIGGINSON:

It's a paradox and not easy to resolve, and I am not optimistic that it can be resolved in the short term. I do suspect, however, that it can be gradually resolved in the long term with improved education and positive modification in certain lifestyles. It is informative to look at the consumption of cigarettes in the United Kingdom over the last 15 years. In the population group with the highest education, e.g., professionals and college graduates, cigarette smoking has fallen to approximately one half of that in the early sixties. In contrast, in the group with the least education, there has been practically no change. This indicates that with education, people will listen. I believe it is the responsibility of the government to provide a total educational plan regarding health hazards. Thus, children should not be permitted to smoke at school. In my time, you could get expelled for smoking. Draconian efforts to control smoking among children are being tried in France. Teachers are not allowed to smoke in class, but only in a special room. All of us have seen the marked changes that are taking place in airline travel, and it is interesting to note that many smokers prefer the non-smoking seats for short trips. Unfortunately, the group on which education has had the least effect is the young female.

ACSH:

IS IT LIKELY THAT THERE IS YET SOME UNDISCOVERED FACTOR THAT IS RESPONSIBLE FOR A LARGE NUMBER OF CANCERS?

**HIGGINSON:**

Certainly, but you have to consider each site individually, and separate possible causative factors from an understanding of mechanisms. We don't understand the mechanisms of breast cancer, a very important female cancer, nor the external factors involved. We suspect the involvement of hormones, which may be altered by sexual and behavioral patterns such as number of children, age at first pregnancy, and so on, and also diet. But our knowledge does not at present permit definitive recommendations as to prevention. Similarly, for cancers of the stomach and large intestine. Again, there are many hypotheses, but few of them are supported by adequate data, especially in relation to lifestyle.

ACSH:

CAN YOU COMMENT ON THE RECENT REPORT BY THE FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY ON COLON CANCER AND THE LOW FIBER DIET?

HIGGINSON:

In all studies on colon cancer, the only risk factor that seems consistent is low fiber; high fiber seems to have a protective effect. However, there are many different types of fiber. There are lots of hypotheses regarding the action of fiber besides regularity. I am sufficiently convinced of the possibility that I now take All Bran at breakfast, which I didn't do before. That is the sum total of the dietary changes that I have made, apart from not over-eating, in the last 30 years, and the only ones for which I would say that the evidence is sufficiently satisfactory. Further, the action is certainly not going to do any harm, and may do some good. Forty years ago I was told that roughage was a good thing, and as a kid I was made to have roughage for breakfast. I was taught in medical school that it prevented all sorts of diseases of the large intestine. Then it dropped out as old-fashioned medicine, granny stuff. Now it's back in again.

ACSH:

YOU HAVE PREVIOUSLY MADE THE STATE-

MENT, "IN OTHER WORDS, I BELIEVE THAT OVEREMPHASIS ON CHEMICALS HAS DISTORTED OUR APPROACH TO THE ENVIRONMENTAL THEORY FOR MANY CANCERS."

HIGGINSON:

This statement obviously excluded discussion of point-source exposures such as occupation and medical drugs, which represent a different problem. However, the belief that the great burden of cancer of so far unknown cause is largely due to diffuse chemical pollution of food, water, and air, and can be controlled through identification and avoidance of one synthetic carcinogen only, has little support. Thus, studies of the vast number of compounds that are present in the general environment do not suggest that any individual compound is a predominant factor for most sites. The possibilities of guaranteeing prevention through such action are extraordinarily low. About 1500 compounds have been identified in alcoholic beverages and more than that in average municipal water. These include many animal carcinogens. It is impossible to evaluate the impact of each of these compounds on an individual basis. However, it may be possible to evaluate their impact on the total burden in man. When this is done, you will find that there is no real difference in terms of cancer between people served by polluted and non-polluted water, as in the case of arsenic in Taiwanese water. In Utah there is no difference in overall cancer incidence in Mormons in urban and rural areas, in contrast to national differences in non-Mormons. Even where there is obvious evidence of pollution, e.g., as in the air of Los Angeles, evidence of a major impact on lung cancer in non-smokers remains to be proven. On the other hand, this does not imply that unnecessary pollution should be tolerated. No one wishes to drink unnecessarily dirty water or breathe sooty air. People have forgotten, however, that things have gotten a lot better. There have been vast improvements in London, and also in some U.S. cities. But if such pollution is not the cause of 70-80 percent of cancers in women and 40-50 percent of cancers in men, those of unknown origin, then what are the causes? At this point, the problem becomes completely different. Thus, while recognizing the difficulties of identifying specific factors which may have initiated a specific cancer, we now accept the possibility of modulating factors associated with diet and lifestyle, and their role on cancer mechanisms. The effect of diet on fetal life, infancy, and childhood, is only just beginning to be recognized. We know people vary widely in their ability to metabolize and modify certain foodstuffs, and further that the latter have a marked effect on the metabolism of cancer-producing agents. While the role of lifestyle does not represent a chemical or industrial carcinogen in the classical sense, as represented by occupational exposures or cigarette smoking, it does reflect a biochemical background. These comments don't mean that you shouldn't control pollution and waste disposal, etc. That's another question. But the point is, that concentration only on polluting factors is unlikely to permit control of a great portion of the cancer burden, and that a whole new field of research is opening up. ■

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THE FOOD INDUSTRY AND NUTRITION

by Kathleen A. Meister

Many people who are interested in nutrition think that the food industry doesn't share this interest, and that food manufacturers are unresponsive to consumer needs in this area. This impression is false. The industry is very aware of the increasing public interest in nutrition, and virtually every company has made systematic efforts to provide consumers with nutrition information about its products. Many have gone far beyond this basic responsibility and have undertaken substantial nutrition-related activities that benefit the consumer. These include establishment of corporate nutrition policies and nutrition advisory boards, involvement in basic nutrition research, and publication of educational materials.

However, the food industry's involvement in nutrition also has a negative side. A company's main goal, of course, is to sell its products at a reasonable profit. As public interest in nutrition has become increasingly intense, it has provided opportunities for exploitation of this interest for marketing purposes. This has led to distortions of nutrition facts that can mislead and confuse consumers.

Nutrition Activities of Food Companies

Increasing numbers of packaged foods carry nutrition labelling, but even if a product doesn't have this kind of label, nutrition information is almost always available from the manufacturer. Most companies take consumer complaints, requests for information, and other inquiries seriously. For instance, Best Foods has a stated policy of responding to all consumer correspondence within 48 hours of receipt.

Most large food companies have developed corporate policy statements on nutrition, dealing with such topics as accuracy of nutrition information in advertising, support for nutrition research, and provision of nutrition information to consumers. These policies tend to be general and innocuous. Few deal with specific nutrition topics or take stands on controversial issues. The primary significance of these statements is that they indicate that the company realizes nutrition is important enough to demand an official corporate policy.



Today, nutrition commands this kind of attention even in firms that produce relatively limited lines of food products. For instance, a nutrition policy statement is currently being developed at Frito-Lay. Procter and Gamble, which sells only a few grocery products, has an informal (unpublished) nutrition policy, and maintains an active program of basic nutrition research.

In addition to forming a committee within the company to determine nutrition policy and guide research and development, some food manufacturers, such as Universal Foods and Kraft, have established advisory boards of outside experts to provide additional scientific input in nutrition matters. Best Foods established such a board more than forty years ago.

Food processors have worked closely with government agencies in nutrition research efforts ranging from the design of enrichment programs in the 1940s to the development of uniform nutrition labelling in the 1970s. Today, the larger food com-

panies have extensive nutrition research programs. Many research efforts are directly aimed at meeting consumer needs. For instance, at Oscar Mayer, the corporate nutrition task force is investigating ways to reduce or replace sodium in processed meats, while retaining acceptable product quality. This project was undertaken in response to expressed health professional and consumer concerns about sodium and hypertension.

Some segments of the food industry are involved in nutrition activities that go beyond the promotion or development of specific products. Numerous companies support and participate in the activities of professional organizations such as the National Nutrition Consortium and the Institute of Food Technologists. Trade organizations, such as the National Dairy Council, the Sugar Association, the Cereal Institute, and Grocery Manufacturers of America, publish nutrition information for

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professionals and consumers. Some individual companies have similar programs, of which the following are only a few examples.

Foremost Foods produces a high-quality quarterly publication entitled *The Professional Nutritionist*.

Kraft publishes an extensive line of booklets for consumers on topics such as food and nutrition terms, food selection, storage and preparation, and guidelines to good health.

General Mills publishes a monthly newsletter called *Contemporary Nutrition*. It is designed for health professionals and each article is written by an expert on the specific subject.

Nabisco has recorded a set of radio spots on nutrition, distributed them to stations throughout the country, and published them in a consumer brochure.

As part of a continuing public affairs program on food issues, General Foods recently took out a series of full-page ads in major newspapers, reprinting and explaining the federal government's Dietary Guidelines. Federal health officials praised these ads as "intellectually honest."

Nutrition Exploitation

Some manufacturers have capitalized on popular ideas about nutrition that don't coincide with scientific facts. For instance, popular wisdom condemns sugar, but scientific evidence implicates it in only one health problem, tooth decay, and even then only when consumed in a sticky form in between meals, not when consumed as part of a meal. Nevertheless, some companies exploit the lack of sugar in their products as a major selling point. A recent television commercial for Aunt Millie's spaghetti sauce based its entire pitch around the rather irrelevant fact that this brand of sauce contains no sugar, while a major competitor's product does.

Consumer attitudes may also influence product formulation. One yogurt manufacturer complained that the mention of sugar on the labels of his fruit-flavored yogurts was damaging to the products' image. He considered substituting honey, because it has a better image, even though he acknowledged that honey is merely sugar in another form.

Another form of exploitation has become so common that this entire newsletter could easily be devoted to listing examples. This, of course, is the extensive use of such terms as "all-natural,"

"organic," "no additives," and "no artificial anything" in food advertising and labelling. Many consumers believe that such products are of better quality and more nutritious than other products. In fact, there is little difference. Sometimes a "natural" product may even be of inferior quality if a preservative which would otherwise have lengthened its shelf life has been omitted. However, many people think that "natural" products are always better, and food manufacturers and advertisers reinforce this misconception.

Although the nutrition information presented in food company publications is almost invariably accurate, each manufacturer tends to emphasize the nutritional advantages of its products and ignores the disadvantages. Different companies may also present nutrition information in different ways, to favor their own products. Unfortunately, this may confuse consumers.

For example, informational booklets published by Oscar Mayer (producers of meat products) and Best Foods (manufacturers of peanut butter and many other packaged foods) both include tables listing the fat contents of a variety of foods. However, the Oscar Mayer table lists the *percentage of fat* in each food (bologna 30 percent, peanut butter 52 percent) while the Best Foods table lists the *percentage of calories from fat* (bologna 82 percent, peanut butter 74 percent). Both sets of figures are correct, and nutrition experts do not agree about which system more effectively conveys information about the fat content of foods. Although there is no overt deception here, most people would be very confused about the relative "fattiness" of bologna, peanut butter, and the other foods listed after reading both tables.

Addition of nutrients to specific food products has been an effective way of correcting some forms of malnutrition. However, indiscriminate fortification of food products, for the purpose of generating impressive figures to put on nutrition labels, does little to improve public health. Overfortification can encourage careless eating habits and, since some nutrients are toxic in excess amounts, it may even be directly harmful to health. Fortunately, many food manufacturers realize this. The nutrition policies of Kraft, Oscar Mayer, Kellogg, General Mills, and many other companies include statements that nutrient additions

will be made only when appropriate. However, it should also be noted that Kellogg and General Mills each produce one breakfast cereal (Most and Total, respectively) so highly fortified that it must be labelled as a *supplement* rather than a food. The suitability of these products is subject to question.

Selling Nutrition in the 1980s

It has been said many times in the past that "you can't sell nutrition." There is increasing evidence that this is no longer true. The Second (1980) *Woman's Day* Survey indicated that one out of two consumers uses nutrition labelling to compare food brands. According to a General Mills study, over 40 percent of consumers check the nutrient content of a product before buying it for the first time. A recent study by Arthur D. Little, Inc., concluded that public interest in the nutritional value and healthfulness of food is genuine and here to stay and predicted that products with a healthful image will sell well in the 1980s. Many recently introduced nutrition-oriented products and advertising campaigns have been successful. *The New York Times* has reported that increasingly large sums of money are being invested in the research, development, and advertising of nutrition by food companies in response to the growing recognition that nutrition sells.

An editorial column in the November 1980 issue of the trade journal, *Cereal Foods World*, pointed out that food manufacturers would have much to gain in terms of sales, credibility, and relations with government agencies if they regarded themselves as members of the "health care team." If food companies adopt this attitude toward the marketing of nutrition, both producers and consumers will benefit. However, if food manufacturers regard nutrition as merely the latest food fad to be exploited in product development and advertising, without regard to the real nutritional needs of the public, they will be failing to meet their responsibilities to their customers. ■

Kathleen Meister, M.S., is a research associate with ACSH.

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BOOK REVIEWS

TITLE: *Three Mile Island: The Hour-by-Hour Account of What Really Happened*
AUTHOR: Mark Stephens
PUBLISHER: Random House, New York, 1980
COST: \$11.95 (hardcover)
REVIEWER: Helen E. Kelly, M.P.H.

It was inevitable that the March 1979 incident at the Three Mile Island nuclear power plant would spawn a book such as Mark Stephens' *Three Mile Island*. There is no need to append a subtitle to insure that the reader will know the book's content. The title alone is testimony to the extent to which the incident at Three Mile Island is considered common knowledge.

Perhaps predictably, *Three Mile Island* purports to tell "what really happened during the accident at Three Mile Island." Disclaiming any particular bias, Mark Stephens presents his book as an anatomy of the Three Mile Island (TMI) incident, considering the actions of the utility officials, the government, and the press. Such an impartial dissection of the contributions of the press, government, and industry to the TMI incident and its impact on the American public is greatly needed. Public understanding of what occurred at TMI, both technically and politically, is limited. Much of the confusion has resulted from the contradictory versions of the incident issued by each of the primary players: press, utility, and government. If this book had given an honest critical appraisal of all three groups, it would have provided a great service to truth-seekers everywhere. As it is, Stephens subjects both utility and government to illuminating microscopic examination but leaves the media virtually untouched, rather like a well-feathered fowl beside two uncomfortably plucked comrades. The first inkling that the press will emerge unscathed appears in the prologue of the book where we learn that we will see "how the press tried to do its job." The phrasing of this fragment automatically exonerates the press from any unsavory role in the proceedings. After all, they were only nobly trying to do their job.

However, rather than harp on Stephens' failure to unflinchingly examine those who are, after all, his colleagues (Stephens is a journalist and professor of public affairs communication), it is worthwhile to consider his successes.

For a book which must necessarily deal with innumerable complicated technical processes and even more complicated political processes, *Three Mile Island* is quite readable. At its best, it is as compelling as any popular thriller. Stephens relies heavily on the personalities of the individuals involved in the TMI drama to add interest to the aspects of the incident which might otherwise be less than fascinating to the lay reader. While the technique is effective, Stephens overdoes it. Two hundred and forty names are listed in the index

of *Three Mile Island*, among them Attila the Hun, Groucho Marx, Teddy Roosevelt and, of course, Jane Fonda. The greatest difficulty of the reader is keeping track of this enormous cast of characters.

While Stephens' technical descriptions of what he always refers to as "the accident" are well and simply written, it will probably still be difficult for many readers to visualize the sequence of events in the Unit 2 reactor at Three Mile Island. Illustrations would have been helpful, especially if they included a simple step-by-step flow diagram.

Where Stephens really excels, however, is in his penetrating look at the actions and interactions of the technicians, scientists, and politicians who both dealt with and exacerbated the problems at Three Mile Island. *Three Mile Island* details the incredible lack of coordination between the local and federal governments, the Metropolitan Edison Utility Company, the Nuclear Regulatory Commission (NRC), and a plethora of other agencies which

became involved with TMI. It rapidly becomes evident that much of the blame for the needless psychological damage done to the residents of the TMI area must be laid at the feet of the NRC, an agency which the book portrays as suffering from a sort of organizational St. Vitus' dance.

Stephens says in his prologue that "the story of TMI is generally one of information—its presence, absence, and evasive nature." In a sense, the same may be said of his own book. The absence of a critical review of the vital role the press played in disseminating information and misinformation, and the failure to address the question of the media's responsibility in such events as TMI, prevent the unqualified recommendation of *Three Mile Island* as a fair and complete look at "what really happened." With this reservation, however, the book can be recommended for its thorough examination of the behavior of the utility and the government. After all, two out of three isn't bad. ■



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TITLE: *Atomic Energy: A New Start*
AUTHOR: David E. Lilienthal
PUBLISHER: Harper & Row, New York, 1980
COST: \$8.95 (hardcover)
REVIEWER: Robert V. Kline, Ph.D.

TITLE: *Brain Allergies: The Psychonutrient Connection*
AUTHORS: William H. Philpott, M.D. and Dwight K. Kalita, Ph.D.
PUBLISHER: Keats Publishing, Inc., New Canaan, Connecticut, 1980
COST: \$15.00 (hardcover)
REVIEWER: Betsy McPherrin, M.S.

As founding director and chairman of the Tennessee Valley Authority (TVA) from 1933 to 1947 and the first chairman of the Atomic Energy Commission (AEC), David E. Lilienthal had a long and successful career in administration. In particular, he witnessed and nurtured the development of both the civilian and military nuclear energy programs. In doing so he had to cope with many technical and human difficulties generated by the wide spectrum of uses to which nuclear energy would be put. Civilian versus military control and government versus private development of nuclear energy are two of the thorny issues that had to be dealt with along the way. It is this wide perspective that Lilienthal shares with us in this book.

The TVA is cited as an organization that works well, being run by conscientious, responsive people who are trained on the job. The AEC on the other hand is seen as an organization traditionally devoted to promoting nuclear energy whatever the cost:

Our main objective in the past was to produce electricity with a cheap atom, the cheapest possible, one that would be economically and environmentally competitive with other forms of energy at a time when foreign oil was absurdly cheap and plentiful. This simple formula was shortsighted and dangerously wrong, as we have learned to our cost.

The author contends that, in the rush to implement nuclear energy, safety issues were given short shrift, and cites the Three Mile Island incident as one consequence of this. The anecdotal material brought to bear in support of this contention draws from the author's long experience and is the most interesting aspect of the book.

After quitting the AEC, Lilienthal became a vociferous critic of the agency. In about 1963 he attacked the agency's conflicting role as both promoter and regulator of nuclear energy. Partly as a result of this conflict of interests, the U.S. Congress eventually disbanded the AEC and formed the Nuclear Regulatory Commission.

The theme of the book, and presumably the reason why it was written, is contained in the following:

Our new objective must be to find a safer, "healthier" method of producing peaceful energy from the atom by a method that also minimizes or eliminates the present risk of furthering the spread of nuclear weapons. If it is also cheap, or relatively cheap, fine; but first it must be safe.

At this point nuclear energy, as an energy source, becomes a thing unto itself: "ordinary

standards are not good enough for nuclear power." Apparently because of the potential connection with nuclear weapons, the concern for safety becomes both an obsession and a conceptual trap. In at least ten other places in the book an appeal is made for someone to develop a fundamentally new method of obtaining energy from nuclear material, one that is inherently safe. Just how is not even a matter of speculation.

The author's desire to place nuclear energy in a category by itself is, however, a conceptual trap. No method of producing energy is without risk. The magnitude of the risk can only be reasonably determined by looking at an energy system in its entirety. Total risks incurred by each system must be compared. Coal-fired power plants incur risks associated with mining, transportation, pollution, waste and ash disposal, etc. Viewed in this way, nuclear energy may be inherently no more dangerous than any other; the problems are simply different.

The importance of energy in our society is not minimized. In a short summary of the energy options available today, the author acknowledges the necessary role that nuclear energy will have to play in the foreseeable future: "We cannot reject out of hand any possibility, including nuclear power. But it must be safe."

The importance of affordable energy is waved away, however, when it is said: "If it is cheap, or relatively cheap, fine." To be acceptable, any energy system must be both safe and produce energy that is economically competitive with other methods of production. A safe system producing expensive energy is of limited interest.

Parts of the book are entertaining, but overall the hindsights are more interesting than the foresights. The author fails to recognize that existing nuclear power plants can be made safer for a relatively small increase in cost. The author's vague calling, in the book's title, for a fundamentally new approach to nuclear power production is, realistically, little more than wishful forecasting.

Robert Kline, Ph.D., is a Fellow of the Interdisciplinary Program on Health at Harvard University.

The authors of *Brain Allergies* seek "to acquaint the lay reader, as well as the concerned physician, with the concepts of orthomolecular medicine and human ecology." The book does, indeed, "acquaint," but the thoughtful reader will wish for greater documentation and less side-stepping of vital questions.

Human ecology, according to Philpott and Kalita, is the scientific examination of man's environment in order to discover sources of environmentally produced illness. They believe that up to 60 percent of the symptoms attributed to such mental illnesses as schizophrenia are actually "allergic" reactions to various environmental stimuli such as foods, inhalants, animals, etc. (The term "maladaptive reaction" is used, since the reactions are not necessarily allergies in the classical sense, wherein a specific "allergen" such as pollen elicits antibody production.) Philpott claims that of 250 consecutive patients, most had "maladaptive reactions," including 92 percent of the schizophrenics. One third of his patients reportedly react to common environmental chemicals (insecticides, preservatives, additives, chlorine in water, etc.).

Philpott, Kalita, and others hypothesize that maladaptive reactions result from "addiction" to certain foods or chemicals. When the addictive substance is used frequently, all is well. Maladaptive reactions occur in response to "chronic stress" such as an overload of the "allergen," harbored infection, or other physical and emotional stress.

Abnormalities in blood sugar level (diabetes and hypoglycemia), are said to be allergic responses to specific foods, which are not necessarily carbohydrates.

Philpott tests for such maladaptive substances by fasting patients for four days, then exposing them to the substance, whereupon susceptible individuals show an "immediate reaction with an allergic-like quality." For example, one patient responded to wheat with sneezing, laughing, and pacing, to black olives with a two-hour headache, and to dates with a running nose and "hard-to-please" attitude. (Classic allergists apparently refer to this as "presumptive evidence" of a cause-and-effect relationship, since the patients are aware they are being challenged with suspect foods.)

The "cure" for such addiction is what the authors call the "diversified rotation diet." Foods or food families that evoke responses are avoided for three months or more. After that, if a food is eaten infrequently, say once every four days, no symptoms are evoked. The testing and therapy appear similar to those used by conventional allergists.

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HEALTH WATCH

Contempt of Court

An ACSH member from Ohio sent us an article from the *Cleveland Plain Dealer* about some extraordinary goings-on in the juvenile courts of Licking County, Ohio. One of the judges there believes that hostility and aggression in children can be attributed to their consumption of certain foods, including milk, flour, chocolate, sugar, and gelatin, and applies these scientifically unfounded beliefs on the job. Juvenile offenders who come into his court are required to fill out a diet questionnaire, and if the results indicate that food "might be a factor in behavior," they are put on a restricted diet. According to the judge, "It's got to be cold turkey all the way."

We're getting accustomed to health hogwash, but it's disturbing to find out that in some places, it has the forces of law behind it.

Physician's Rx for Herpes

A *News & Views* reader from Washington, D.C. provided another excellent addition to our hogwash file: an article from the magazine *Sexology Today* entitled "Controlling Herpes with Food."

Herpes type II is a virus that can cause painful, recurring outbreaks of blisters, mostly in the genital region. No cure for this sexually transmitted disease has been found, and the symptoms tend to come and go. These characteristics and the personal nature of the problem make it a perfect target for home remedies, folk "cures," and the kind of nutritional nonsense found in the magazine article. According to the magazine, herpes sufferers should avoid sugar, vitamin E, and fat, and increase their intake of vitamin C to levels of questionable safety. One should also eat more of the amino acid lysine and less of the amino acid arginine. What this means, in practical terms, is to avoid chocolate-covered peanuts, which apparently have an unfavorable lysine/arginine ratio, and can supposedly "precipitate recurrence of active herpes the next day."

Scientific evidence to support these menu suggestions is lacking. However, the article gives the impression that this information has a scientific basis because it is drawn from a public presentation by a university physician. Of course, training in medicine or nutrition is not required for a degree in physics, and a lecture at an "alternate lifestyles convention" is a far cry from a publication in a peer-reviewed scientific journal. Unfortunately, it is unlikely that most readers of this magazine article appreciated these distinctions.

USDA Boss on Food Safety

In an interview published in the February issue of the Washington newsletter, *Nutrition Intelligence*, John Block, the new Secretary of Agriculture, was asked his opinion on the subject of using risk-benefit analysis to make food safety decisions. Secretary Block replied, "I think we almost have to move to something

like that, because there's risk in almost anything we do or eat. . . . Still, a lot of these things we have to have. Vitamin D is an example. If you eat too much vitamin D, it's a carcinogen. But we have to have it."

Mr. Block's comments are an example of the new, more realistic approach to food safety issues that we've been hoping to see.

Rare Courage

We have noted before (see "Conspiracy of Silence?", *ACSH News & Views*, Volume 1, No. 2) that most magazines devote little attention to the hazards of cigarette smoking. It's a pleasure to be able to point out an exception to this rule. The December 1980 issue of the personality magazine *Modern People* featured a hard-hitting cover story on the dangers of cigarettes, entitled "How the Tobacco Companies Are Sending You to an Early Grave." In addition to presenting the medical evidence against smoking, the article captured readers' attention with pictures of celebrities, including John Wayne, Humphrey Bogart, Betty Grable, and Nat King Cole, who died of smoking-related diseases. The striking cover showed pictures of eight convicted murderers and a cigarette pack, with the caption "All of These Killers Are Dead or in Prison Except One." *Modern People* also ran a follow-up story in its next issue on how to quit smoking. Many readers of the first article were undoubtedly receptive to that kind of information.

Clear Vision at FDA

Some people fear that the new administration will threaten public health with its efforts to cut down on government regulation. We disagree. There are some truly necessary regulations which must be kept in effect, and we think that the administration realizes this. However, there is a real need to stop the overwhelming flow of unnecessary regulations, which create problems rather than solve them.

A good example of the latter occurred when an administrator at the Food and Drug Administration (FDA) had salt tablets used in the care of soft contact lenses taken off the market. The FDA decided that people couldn't be trusted to prepare their own solution for storing and cleaning their lenses. By taking away the tablets, FDA forced contact lens wearers to buy prepared salt solutions. Unfortunately, these solutions cost six times as much as the tablets, and they contain a preservative that can cause bothersome allergic reactions in some people. On the other hand, doctors have reported no problems with the salt tablets as long as they were used properly.

After receiving many complaints from the public, a House subcommittee conducted an investigation of this incident and concluded, quite reasonably, that there was no basis for withdrawing the salt tablets from the market. We certainly need regulatory agencies to pro-

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EDITORIAL:

At the present time there is unprecedented interest in the subject of nutrition in this country. Our people, consumer advocate groups, health food devotees, voluntary health agencies, the United States government through its various departments and institutes, congressional committees, and the National Academy of Sciences are concerned about nutrition practices and policy. Why has this come about in the last decade? Possibly because Americans, since Vietnam, have become disillusioned with the conventional institutions of government, industry, medicine, and education, and have increasingly devoted their attention to self and self-entitlement. Since adequate food is clearly required for personal health, much attention has been centered on the value of foods.

Mythology of food is an ancient and recognized phenomenon and postulates that foods have powers of healing beyond their nutritional values. Because of the emotional and cultural values of foods, nutrition is subject to more political action than many other branches of natural science. Politics deals with the defense of the party (institution, political group, cult, or position) whereas science deals with the investigation of truth.

Why is nutritional science so susceptible to the intervention of politics? There are several reasons. First, nutrition is big business not only for the production of foods but also health foods. Second, food mythology fosters beliefs rather than understanding and leads to emotional investments in given nutritional concepts, i.e. cultism, whether the concept is scientifically valid or not. Third, the press plays a big role in nutrition education and individual food writers wield significant power in determining nutrition policy. Some journalists believe that because they write about nutrition they are, *de facto*, experts in the science. Many are consumer activists and naturopaths. Finally, nutrition programs get votes.

A prime example of politics in nutrition is the reception given to the recent report of the 15-member Food and Nutrition Board of the National Academy of Sciences on the relationship of diet to disease. "Toward Healthful Diets," released on May 28, 1980, summarized a critical scientific review of over 400 medical papers to determine what advice should be given to the American public about diet aimed at prevention of the chronic degenerative diseases. Using as its principal criterion that proof of benefit should be demonstrated for a public health measure before it is generally recommended to the public, the Board advised healthy Americans to: (1) eat a variety of foods to obtain each day's nutritional requirements, (2) eat moderately to maintain desired weight,

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The Science and Politics of Nutrition

(3) avoid alcohol, sugar, fats, and oils if one needs to lose weight or has a very sedentary occupation, (4) increase physical activity fitness, and (5) use salt in moderation.

Although these modest recommendations were supported by the American Medical Association and by a segment of the food industry, the report elicited a storm of criticism from the American Heart Association, consumer advocates, the government Departments of Agriculture and Health, and many journalists.

In its June 3, 1980 editorial entitled "A Confusing Diet of Fact," *The New York Times* stated, "The National Academy of Sciences is supposed to be an authoritative, impartial source of scientific advice to both the public and the government, the supreme court of science. But its latest report on healthful diets is so one-sided that it makes a dubious guide in national nutrition policies." Dr. Mark Hegsted, administrator, Human Nutrition Center of the USDA, said on July 31 that "the Food and Nutrition Board is irresponsible in not making a recommendation on dietary cholesterol." Although the American Heart Association admitted in a news conference on August 8 that "the scientific evidence is lacking that cholesterol-lowering will reduce or prevent heart attacks," it nonetheless endorsed its previous position, urging Americans to reduce total fat, saturated fat, and dietary cholesterol in the hope of preventing coronary heart disease. Representative Fred Richmond of the House Subcommittee on Domestic Marketing, Consumer Relations, and Nutrition stated on June 18 that he felt that the Food and Nutrition Board had overstepped its charter and violated its authority by putting forward a public policy advising the American people about what kind of diet to follow. Several consumer advocates made *ad hominem* attacks on Board members, alleging that their consultancies with segments of the food industry proved industry bias. All these were political arguments that did not deal with the scientific content of the report.

This furor illustrated the extent to which the field of nutrition is dominated by politics rather than by science. Vested interests took precedence over scientific criticism and the report was attacked in order to advance those interests. Most scientists would argue in general that if data are incomplete or unconvincing, as are the data relating diet modification to prevention of heart disease, then it is better to withhold final conclusions and particularly advice to the public until there is tangible proof of benefit. Intervention in susceptible populations with both diet and drugs to alter overall mortality rates from a variety of chronic diseases by changing serum

cholesterol levels has uniformly failed.

The data linking dietary cholesterol to cardiovascular disease are very weak. The intake of dietary cholesterol in the United States has not changed appreciably in 70 years and does not correlate with the rise in the incidence of coronary heart disease that occurred in this country between 1920 and 1983 nor with its fall from 1983 to the present time. Furthermore, in the U.S. no correlation has been made between any component of diet, including saturated fat and cholesterol intake, and the risk of coronary heart disease. In free-living populations it has been shown that wide-range altering of dietary cholesterol has little, if any, effect on serum cholesterol. Although LDL-cholesterol in plasma is a risk factor for coronary heart disease, the Board decided, in company with five other national expert committees from Canada, England, Australia, New Zealand, and Norway, that dietary cholesterol is not a risk factor for coronary heart disease.

It is my view that science will eventually triumph over politics in scientific disputes, although in the case of Galileo it took centuries. The Food and Nutrition Board report has stimulated considerable debate and dissent in professional circles in the past several months. Dr. Thomas James, in his 1980 presidential address to the American Heart Association (AHA) entitled "Sure Cures, Quick Fixes, and Easy Answers: A Cautionary Tale About Coronary Disease," said, "Today I want to share with you my growing concern about overpromise in coronary disease. My remarks center around the credibility of the AHA and medical science generally." He continued by making four main points in his address: (1) we should be more explicit, i.e. make full disclosures of the basis for public recommendations; (2) we should distinguish between risk reduction and true prevention for individuals; (3) we should be aware of the coercive power of public advice, i.e. in generating regulation, and (4) we should admit that we do not know the full effects of dietary restriction in childhood.

Atherosclerosis and its principal clinical expression, coronary heart disease, is a disease of unknown cause and is contributed to by many factors in addition to diet. Coronary heart disease is not a nutritional disease like rickets or pellagra. Only 50 percent of the risk of suffering a heart attack is accounted for by all the risk factors, which include family history of heart disease, obesity, diabetes, hypercholesterolemia (high plasma LDL-cholesterol), high blood pressure, cigarette smoking, and inactivity. Platelets, little cellular particles in the blood, play an important part in the initiation of the disease. The public must understand that the solution to the medical riddle of atherosclerosis is not for

politicians but for scientists to solve by careful investigations of true cause-and-effect relationships in the body. An entirely new strategy of prevention may be needed!

One hopeful development is that the mortality rate from coronary heart disease has been decreasing in our country over the past twenty years at the rate of 1-2 percent per year. The National Institutes of Health has concluded this positive result is not due to any single factor. Even when the slight changes in diet, serum cholesterol, smoking, blood pressure, and physical activity are summed, the result exceeds expectations. Further scientific research is needed to understand even the good things that are happening to the U.S. population.

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MISLEADING MEGADOSES

by David B. Roll, Ph.D.

Although one expects to find the advocacy of megadoses of vitamins in the health cult literatures, it is disappointing to discover uncritical endorsement of this practice in literature directed at health professionals. Yet, such an article recently appeared in *American Pharmacy* (Vol. NS 19, No. 9, p. 498, 1979), a publication of the American Pharmaceutical Association (APhA). One would hope that the editors of such a prestigious publication, aimed at health professionals having a minimum of five years of college education, would show more sophistication in their selection of articles or at the very least submit them for peer review prior to publication.

The fallacy of megadosage is well covered by Ron Deutsch in his excellent book *Realities of Nutrition* (Bull Publishing Co., Palo Alto, CA, 1976) in which he points out that, since mankind was successful in evolving on the food readily available, we would not expect to find large natural barriers preventing access to foods needed for health. The following table shows some of the recommendations made in the paper cited in *American Pharmacy*. Also included is the amount of food (in all cases an excellent source of the vitamins) was used in the calculations that would be required to obtain the quantity recommended.

Vitamin	Quantity Recommended	Food Needed to Obtain Quantity Recommended
E	840 IU	15.2 lb. of wheat germ
C	5280 mg	18.9 lb. of oranges
B ₁	52 mg	19.8 lb. of roast pork
B ₂	52 mg	68.0 lb. of whole milk
Niacinamide	32 mg	3.7 lb. of peanuts

Keeping in mind that the energy requirement for a 23-year-old male is 2700 calories (2000 calories for a female), it is interesting to note the approximate number of calories that would be found in these quantities of food, namely, wheat germ (25,000 calories); oranges (4800 calories); pork (12,400 calories); milk (20,400 calories); peanuts (9500 calories).

Such quantities of food are not compatible with life, and make the advocacy of such high quantities of vitamins suspect at best. Is it not reasonable to ask why, after our reasonably successful evolution, it is now necessary to rely on megadoses of nutrients that we have not required in the past?

Among the alleged benefits cited in the article for such a regimen are "better" health and metabolism and more energy, with the evidence for such claims being largely anecdotal. When the quantities of food noted are considered, one might add to the list massive obesity. Obviously this would not lead to better health even if we could tolerate such tremendous quantities of food.

It is our hope that APhA will reevaluate its editorial policies with the aim of insuring that scientific inquiry and not just personal opinions and anecdotes is retained as the foundation upon which all legitimate health professions are based.

Dr. Roll is Professor of Medicinal Chemistry at the College of Pharmacy, University of Utah.



Book Review

(continued from page 7)

Philpott believes that "super" nutrition, via intravenous and oral megadoses of individual nutrients, reduces the incidence and severity of maladaptive reactions. This is the "orthomolecular" part of the treatment. For example, a woman who was maladaptive to wheat reportedly had no symptoms when wheat was eaten after receiving intravenously 7.5 grams of Vitamin C (125 times the Recommended Dietary Allowance) and one gram each of pyridoxine and niacin (500 and 77 times the RDA, respectively).

Book chapters describe "the healing powers of Vitamin C," "the perils of toxic molecular medicine," and a theory of "the disease process."

The authors' observations (bizarre case histories appear throughout the book) are fascinating, but they are merely observations. Philpott and Kalita recognize "the need for long-term, intense—and necessarily expensive—scientific evaluations of clinical orthomolecular-ecologic medicine as applied to chronic degenerative diseases." They are less credible when they state that "without double blind studies, we have believable evidence of a cause-and-effect relationship," and when they recommend the rotation diet to everyone because "Americans are eating... foods with a frequency that is beyond our biological capability to handle in a healthy way." If there are controlled studies which support the latter statement, they are not mentioned in the text.

Philpott delves little into mechanisms which might explain his observations, stating that "even when there is a demonstrated evidence of symptom production on exposure to a food or chemical, we still do not know why," and postulating the causes as "immunological, metabolic errors, enzyme deficiencies, nutrient deficiencies, toxins, infections, or something else."

They say you can't argue with success, but it is not clear that the orthomolecular-ecologic approach has been successful. All of the case histories have happy endings, but there is no mention of failures or long-term follow-up, and the authors claim no specific rate of success. The rotation diets are potentially safe and nutritious, but many of the specific foods allowed each day are seasonal, prohibitively expensive, or otherwise unavailable in most parts of the United States. Different cooking oils, herbs and spices, and sweeteners must be used on each day of a four- or seven-day cycle. Most prepared foods, even those as basic as bread and cereals, are unacceptable. The alternative is "cooking from scratch" (using special recipes) or doing without. How many patients could adhere to such a stringent and time-consuming diet?

The book aroused this reader's interest in allergy and the brain-nutrient connection. However, I would not recommend it to people who don't know the difference between a study and a story.

Betsy McPherrin, M.S., is a nutritionist and free-lance writer.

Health Watch

(continued from page 8)

fect us from hazards that are beyond our control. But we don't need them to protect us from ourselves, on the insulting assumption that we are incapable of reading and following directions.

TV Touts Feingold

We were deeply disturbed by a recent segment of the syndicated TV show *PM Magazine* entitled "Diet for Problem Kids." The program consisted of interviews with children who were on the Feingold diet and with their parents (members of a New England area Feingold Association), who were very enthusiastic about the diet's effects on their children. The show not only lacked scientific balance, it lacked science, period. No physician or other professional with expertise in hyperactivity was interviewed. Viewers were never even told that the diet had been tested scientifically, let alone that it had been found to be ineffective. The controversial nature of the Feingold regimen was never mentioned.

This kind of careless approach to a serious problem that deeply troubles many families can only be described as irresponsible journalism.

Caffeine Confusion

ACSH found itself in the midst of confusion last month when our report on caffeine, which concluded that this food and drug component is not a threat to human health, was released just after the publication of a Harvard School of Public Health study suggesting a statistical link between coffee consumption and pancreatic cancer.

Actually, there is no contradiction between the two studies. Our report focused specifically on caffeine, a compound found in tea, cocoa, some soft drinks, and some medications as well as in coffee. The Harvard study focused specifically on coffee, a complex mixture of more than three hundred substances, one of which is caffeine.

The Harvard study was preliminary, as its authors pointed out. It raised a hypothesis that is worthy of further study, but it certainly did not establish a definite link between any coffee component and pancreatic cancer. However, if such a link is established in the future, it is highly unlikely that caffeine will be the implicated substance. In the Harvard study, pancreatic cancer risk was *not* elevated in tea drinkers, and tea contains substantial amounts of caffeine.

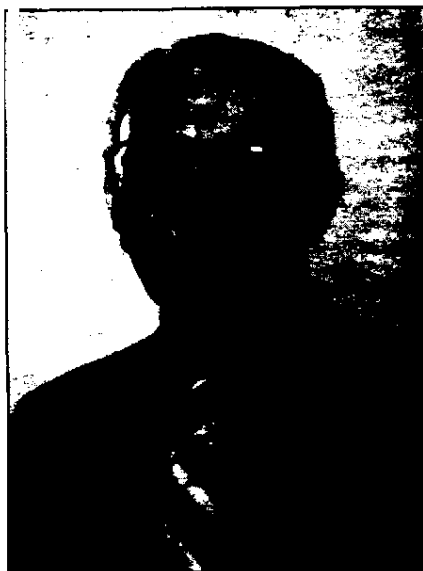
—E.M.W.

PROFILE

HOMAS H. JUKES, Ph.D.

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ACSH's scientific Directors and Advisors are "doers," action people involved in many aspects of their fields. Varied in background, interests, professional affiliations, and geography, they are bound together by their desire to see a new consumer group grow.

We think the ACSH scientists are a unique and interesting group of people that you, our readers, would enjoy getting to know. To help you become acquainted, each issue of NEWS AND VIEWS will feature a biographical PROFILE of one ACSH Director or Advisor.

Recent Publications... "Silent nucleotide substitutions and the molecular evolutionary clock," *Science*, 1980; "Silent nucleotide substitutions during evolution," *Naturwissenschaften*, 1980.

Research... "Molecular evolution and the sequences of DNA molecules."

Turning Point... "The most recent turning point took place in December 1961 at a meeting of the Enzyme Club at Rockefeller University when Dr. Severo Ochoa gave a talk on 'Synthetic polynucleotides and the amino acid code.' I promptly decided to stop what I was doing and enter this new field. For the same reason, I resigned from my job, about a year later to organize a new research group at the University of California, Berkeley. It led me into molecular evolution."

Personal Health Code... "I stopped all use of tobacco in 1953 which was easy because I smoked only one cigarette a day. I gave up coffee about ten years ago, not because of any particular health concern, but because it was a nuisance that 'did nothing for me.' I have no special dietary fads. My food list for heavy exercise on high mountain backpacking trips includes one half pound of sugar per day, starting in 1938. I have no tendency to overeat, apparently, because my weight is approximately normal without 'dieting.' I don't regularly consume either alcohol or vitamin pills. I have a very active family life with my wife, three children, and five grandchildren."

Major public health concerns Americans face... "Cigarette smoking, overeating, quackery, misinformation, and alcoholism."

What do you think will be the most important public health accomplishments in the coming years? "In the coming years, new discoveries in immunology have great potential and so has the development of recombinant DNA technology—not for 'changing individuals,' but for more general applications."

Why did you join the American Council? "I helped start the Council because of the great need for authentic information on matters involving public health, especially nutrition. The need arose from the tremendous amount of misinformation by 'special interest groups,' such as consumerists and environmentalists who start scare stories as a way of life."

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ENVIRONMENTAL UPDATE

Drugs: The controversy over the benefits and risks of estrogen therapy in preventing osteoporosis in postmenopausal women continued unabated with a report in the February issue of the *American Journal of Public Health*. From their study of women enrolled in the Kaiser-Permanente Medical Care Program in Portland, Oregon, authors Johnson and Specht concluded that estrogen replacement therapy reduces the risk of hip fractures. They acknowledged, however, that the small number of study cases limits the strength of their conclusion and that the protective effect among hysterectomized women was smaller than that for the entire study group. Hysterectomized women generally receive greater exposure to exogenous estrogen and would presumably benefit the most from its protective action.

Hip fractures due to osteoporosis, a process of bone thinning resulting from calcium loss, are ten times more frequent in females than males. Although osteoporosis occurs in both males and females beginning around age 35, the rate of bone loss increases significantly in some females after menopause. This acceleration is presumed to be a function of the decrease in natural estrogen that accompanies menopause. However, the exact process by which estrogen influences bone density is not known. To further complicate matters, there are numerous other factors, including insufficient dietary intake of calcium and vitamin D, cigarette smoking, and inactivity which accelerate bone loss in postmenopausal women.

The real controversy, though, lies in the trade-off between estrogen therapy's preventive benefits and its risks of causing endometrial cancer. Epidemiological studies conducted since 1975 have shown an association between long-term (more than 2 years) estrogen use and this form of uterine cancer. Yet among elderly women, endometrial cancer results in far fewer deaths (2700) than those attributed to hip fractures (15,000). Many clinicians advocate prophylactic long-term estrogen therapy for most women who have reached menopause. Even the Food and Drug Administration, through its Endocrine-Metabolic Advisory Committee, has ruled that "estrogens are effective in preventing postmenopausal bone loss and the risks are acceptable."

Many questions about estrogen use to prevent bone fractures remain unanswered. While it is clear that estrogen therapy is an aid in reducing bone loss, it has not been conclusively established that this treatment prevents fractures. The lowest effective dose, minimum duration of treatment, and perhaps most important, a well-defined population at risk are still unknown. Thus, as with the

cholesterol-heart disease controversy, it may be premature to advocate long-term estrogen therapy for most women without more evidence of benefit.

Lifestyle: With the publication of an epidemiological study in the *New England Journal of Medicine* (304(13):745, March 26, 1981), another of life's simple pleasures joins the growing list of cancer hazards. This time it's snuff, a finely ground or powdered tobacco used by many to get "that real tobacco taste."

In a comparison of drinking, cigarette smoking, and snuff dipping habits between a group of North Carolina women with oral and pharyngeal cancer and a control group, researchers found a 4-fold increase in cancer risk associated with snuff dipping in white nonsmokers. Among women using snuff for more than 50 years, the risk for cancer of the gums and oral mucous membranes increased almost 50-fold. A dose-related increase in oral cancer risk was also noted for those who smoked but did not use snuff, and for those who smoked and drank only. White women had a greater increase in cancer risk than black women, apparently because they used snuff in greater amounts over a longer period of years.

The authors identified N-nitrosomnicotine (NNN) as the prime suspect responsible for oral cancer. NNN has tumor initiating properties in laboratory animals and is found in tobacco smoke condensate, chewing tobacco, and snuff. It is formed by bacterial or enzyme action on tobacco during curing and from the mixing of snuff with salivary nitrites.

The original hypothesis linking snuff dipping with oral cancer stems from the geographical distribution of oral cancer deaths generated by the National Cancer Institute's *Cancer Atlas*. Male deaths from this type of cancer are concentrated in the Northeast and are generally thought to result from the combination of cigarette smoking and alcohol use. In contrast, female oral cancer deaths are concentrated in the South, particularly North Carolina, Georgia, and Alabama. This new study suggests that as much as 31 percent of oral cancer in North Carolina is attributable to snuff dipping alone.

The researchers noted that total production of smokeless tobacco products in the U.S. rose from 98 million pounds in 1971 to an estimated 134 million pounds in 1980, with a 3-fold increase in finely cut tobaccos. They expressed concern about the heavy advertising campaigns by the tobacco industry and reports in the medical literature recommending these tobacco products as substitutes for cigarettes. We wholeheartedly concur with the authors' recommendations to educate the public about this hazard. The only safe tobacco product is the one that is not consumed.

Pesticides: Spring is here and with it comes the annual plague of gypsy moths in the Northeast. The voracious larvae of this insect pest defoliated more than 400,000 acres of park and woodlands in New Jersey alone last year and are expected to cause record damage again this year. But despite the availability of an inexpensive and safe pesticide, carbaryl (more popularly known by Union Carbide's trade name, Sevin), many communities are apparently opting for the moths.

Last year we reported that aerial spraying of Sevin was discontinued in many areas because of an alleged relationship with birth defects. Based on this public concern, the Environmental Protection Agency reevaluated the literature on carbaryl and human health. It concluded that there is no evidence that use of this pesticide poses any health risks to humans. Unfortunately, this decision and others by various state environmental agencies did not satisfy carbaryl's critics, and the debate continues.

In our own community of Summit, New Jersey, Sevin has been accused of "a litany of horrors" including Reye's syndrome, birth defects, miscarriages, lowered sperm counts, liver disorders, and "a personal testimony of Sevin-induced blindness." The city council, which approved the use of Sevin, also stands accused of disregarding the rights and health of pregnant women and opting for a "quick fix" because of Sevin's undisputed cost-effectiveness.

If the pragmatic consequences of this fervid emotionalism were not so serious, there would be a great tendency to shake one's head in disbelief. But there is a disturbing schizophrenia towards science that is clearly obvious in this debate. On the one hand, anti-pesticide activists are more than willing to quote vague, allegedly scientific sources which support their contentions. However, more reasoned scientific opinions not in accord with their own are regarded as profit-motivated or "inconclusive." As has been stated many times, Americans today seem willing to accept any opinion of our technological society, as long as it is bad.

—T.S.

URL 05196

The DDT Debate

(continued from page 1)

of the incredible effectiveness of DDT in reducing the incidence of malaria can be seen in India, where ten years of insecticide use reduced the malaria death rate from 750,000 to only 1500. Even more dramatic was the case of Ceylon. With the use of DDT, malaria incidence declined from 2.8 million cases in 1946 to 110 cases in 1961, when the battle was considered won and spraying was abandoned. Seven years later, malaria incidence in Ceylon was back up to 2.5 million, and DDT spraying had to be reinstated.

The final reason that DDT enjoyed such popularity as a pesticide was the fact that it combined high toxicity for insects with low toxicity for other organisms, including man, a fact which may well seem amazing in light of the infamous reputation which this chemical was ultimately to have with the lay public. Thousands of individuals, military and civilian, had their clothing dusted with 10 percent DDT powder while they wore it, without ill effect. More pertinent to the safety issue was the absence of any DDT-related fatality or chronic disease among individuals employed as DDT sprayers in anti-malaria programs, a group estimated at one time as consisting of 130,000 men annually. Nor was any toxic effect noted in the 600 million to one billion people who lived in repeatedly sprayed dwellings. Poisoning with DDT was a rarity, and the only documented instances were the result of massive accidental (and sometimes suicidal) ingestion of the insecticide.

However, despite this generally clean bill of health, DDT use was not completely problem free. For one thing, certain insect strains began to develop resistance to DDT. By 1969, insect resistance to DDT necessitated the use of alternative insecticides in 1 percent of the areas where DDT had originally been used for disease eradication. Of course, it should be remembered that the problem of resistance was not peculiar to DDT, and has been shown to occur with repeated use of any chemical. The occurrence of resistance in some insect species, though disturbing, cannot be considered a rationale for banning a chemical, just as few would suggest discontinuing the general use of penicillin due to the emergence of several penicillin-resistant strains of bacteria.

The greatest problem associated with DDT, however, was that, in a few instances, enthusiastic use became enthusiastic overuse, primarily in the area of agriculture. "If some is good, more is better" was the rationale of some farmers. In addition, whether by accident or carelessness, a few incidents occurred in which concentrated pesticides found their way into lakes and streams. While DDT was not specifically involved in all of these mishaps, its reputation with the public nevertheless suffered from guilt by association.

Proper and responsible application and disposal of DDT were the rule rather than the



exception. Even the increased applications of DDT to cropland, considered damning evidence by those opposed to the pesticide, were sometimes a legitimate, and accepted, response to the development of insect resistance. However, the incidents of carelessness and misuse, both real and exaggerated, inevitably provided ammunition for individuals opposed to DDT use, and were often luridly portrayed to the lay public.

It was this perceived pesticide abuse which helped Rachel Carson's *Silent Spring* to gain acceptance. Considering how effectively this book aided the environmental movement, perhaps a more accurate title would have been "Silent Springboard." The infant environmental movement saw its opportunity when *Silent Spring* was published in 1962, and, by riding the wave of interest and concern generated by Carson's book, gained a position of considerable prominence and power in a relatively short period. It is unknown whether Carson herself would have supported the call for a total ban on DDT around which the environmentalists rallied in the late 1960s; Rachel Carson died in 1964. While *Silent Spring* is certainly hard on DDT, often inaccurately so, it is even harder on certain other pesticides which, it states, make DDT "seem by comparison almost harmless." Ironically, though *Silent Spring* never specifically advocates a ban on DDT or any other pesticide, the Audubon Society's Rachel Carson Memorial Fund was used to support one of the first legal suits for a ban on DDT use.

By the late 1960s, the DDT ban crusade was in full swing, led primarily by the fledgling Environmental Defense Fund (EDF). The popularity of the anti-DDT movement led a 1970 *Nature* editorial to quip, "In the last few months resistance to insecticides has been growing almost faster among people than insects." In 1969, Michigan was the first state to actually ban the chemical, followed by Wisconsin, Arizona, and California. It was in 1969, too, that the EDF, Sierra Club, National

Audubon Society, and a Michigan environmental group petitioned then Secretary of Agriculture Clifford Hardin to ban DDT, alleging it to be a carcinogen. A Commission on Pesticides and Their Relationship to Environmental Health, called the Mrak Commission, was appointed by the Secretary of Health, Education, and Welfare in the same year. On the basis of the recommendations of that commission, the Agriculture Secretary announced a plan for phasing out the use of DDT by December 31, 1970, with the exception of uses essential to protection of public health and welfare. Under this ban, the use of DDT in health-related mosquito control programs and on certain crops, such as cotton, continued to be permitted.

It might be helpful to pause here and briefly describe the basis for opposition to continued use of DDT. The previously mentioned persistence of the insecticide became a thread of fear woven through many other concerns about DDT. While DDT's lengthy residual life was in itself harmless, it was the idea of this persistence linked to the claims of harm to the environment and human beings that generated the real hysteria. It was generally acknowledged that DDT was present throughout the world environment, although this is true for other compounds as well. Small concentrations of DDT were found to be present in the U.S. population, but, according to the Mrak Commission's report, "no reliable study has revealed a causal association between these residues and human disease."

At first, the main concern about DDT revolved around some studies suggesting that it was responsible for causing thin eggshells and, therefore, declining populations of certain bird species such as the brown pelican. Even now there is no scientific consensus as to the validity of this claimed effect; opinions vary on the adequacy of the studies cited as evidence. (Other environmental pollutants, such as PCBs and mercury, may have been responsible for many of the effects.) However,

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The DDT Debate

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this point was probably not the major source of conflict. Nor was the fact that, at some concentrations, DDT is toxic to many crustaceans and fish. Had the environmentalists concentrated only on these dangers to wildlife, there probably would have been far fewer fireworks. But as the movement against DDT gained momentum, other more controversial and frightening hazardous effects were added to the list of DDT's alleged sins. Foremost among these was the assertion that DDT was a carcinogen and posed a substantial threat to human health. DDT does cause liver tumors in mice fed large quantities, but there was and is no evidence that DDT causes cancer in humans, even among those individuals occupationally exposed to very high doses over long periods.

The ban on DDT that was recommended by the Mark Commission was based, as was stated in the Commission report, more on "suspicion of danger" than on proof. In exempting certain essential uses of DDT from the ban, the commission was careful to note that "the current evidence is not sufficient to justify unqualified banning of the insecticide."

The partial ban of DDT, extensive though it was, did not satisfy the environmental groups, who subsequently pressed the newly formed Environmental Protection Agency (EPA) to cancel the remaining registered uses of DDT. Such an action would amount to a total ban on the use and sale of DDT, and would effectively eliminate DDT use worldwide.

It is worth noting that, though the incidents of pesticide overuse which motivated the anti-DDT crusade occurred solely in developed nations such as the U.S., the real hardship of a total DDT ban would fall on poor and starving Third World countries where human existence

is more fragile than thin pelican eggshell. The same economic considerations that made DDT so appealing, and essential, for use in developing nations tended to militate against the wasteful overuse of the chemical by those poorer countries, whether in agriculture or mosquito control campaigns. In fact, the use of DDT for malaria control entails almost no environmental contamination, as spraying is restricted to the inner surfaces of dwellings. In pushing for a total DDT ban then, American environmental elitists were essentially pursuing a course which would punish developing nations for the occasional pesticide excesses of the United States. Time and again the World Health Organization stated that a total ban on DDT would mean the demise of programs against insect-borne disease in Third World nations, and the death of millions of people.

It was this push for a total ban that created the real controversy. In 1971 a hearing was scheduled so that each side could present its case. It is revealing that, while EPA was meant to decide the question of the ban on the basis of the recommendations of the hearing examiner, EPA ultimately participated in the hearings on the anti-DDT side, along with the EDF and conservation groups.

In April of 1972 the hearing examiner, Edmund Sweeney, recommended to EPA that no more extensive ban of DDT was necessary or desirable, based on the evidence presented at the hearings. Yet less than two months later, on June 14, 1972, then Administrator of the EPA William Ruckelshaus banned all of the remaining uses of DDT with the exception of uses related to essential public health purposes. This ban did not affect the sale of DDT to developing nations.

Why Ruckelshaus ignored Sweeney's recommendations is not clear, but his action may have stemmed from a desire to establish the authority of the infant EPA through some muscle flexing. Ruckelshaus' motive was especially perplexing to those who remembered his stated position on DDT two years previous:

DDT is not endangering the public health and has an amazing and exemplary record of safe use. DDT, when properly used at recommended concentrations, does not cause a toxic response in man or other mammals and is not harmful. The carcinogenic claims regarding DDT are unproved speculation.

By making an example of DDT, Ruckelshaus may have hoped to give warning to various environmental bad boys that the new agency meant business, while simultaneously garnering brownie points from environmentalists. Regardless of the intent of the move, it set a precedent for caprice at the EPA which has cropped up in later actions of the agency.

By now, DDT and the furor that surrounded the ban have been largely forgotten, but the reputation of DDT as pariah of the insecticides seems as persistent as the chemical itself. As recently as last August, a magazine article accused U.S. chemical companies of exporting cancer in the form of DDT, thus giving new life to that tired old sophistry.

At the time of the DDT ban, much was made of the need for more reliable research, particularly on the human health effects of DDT exposure. However, in a classic example of what happens when cautionary bans are instituted pending more data, studies on DDT waned following the ban. *Ex post facto* research rarely excites much interest or research grant funding.

In retrospect, it is difficult to say whether the ban on DDT was harmful. Other pesticides were available, and relatively affordable, in this country, and the continued availability of DDT for export insured the maintenance of vital food and public health programs in developing nations. On the other hand, misconceptions about the alleged hazards of DDT were also effectively exported to Third World countries, and may have discouraged truly essential uses of the pesticide.

But however uncertain the effects of the ban itself, the process of the debate was disastrous. The DDT conflict set a pattern for environmental decisions based less on scientific evaluation of risk than on hysteria, mud-slinging, and hyperbole. The rigid dichotomizing of issues and the enshrinement of The Cause are by now honored traditions, stemming from the format of that prototypic contest, the DDT debate.

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