

Once we were told that vegetable shortening and margarine were good for us. Not anymore.

Heart Breaker

More than 30 years ago, a Maryland scientist began making noise about the **mortal dangers** associated with trans fats. How come it took the FDA so long to tell the rest of us? BY NINA TEICHOLZ

DR. MARY ENIG doesn't look like someone who would inspire fear or animosity in anybody, much less the nation's behemoth food industry and the army of lobbyists that backs it up. With her thick glasses and bramble of gray hair, Enig, who uses a walker, seems more of an endearing grandmother. Her sentences tend to wander off into minutiae—about her husband's work or a recent snag at the post office. She doesn't slice through issues with the acuity of a scientist. Yet some 30 years ago, as a graduate student, Enig stumbled upon research suggesting that the official line being touted by the government and the corporate food world was probably a long way from the truth. In the years that followed, she pursued the matter with a vengeance. And she still has the enemies to prove it.

"Here's the paper I wrote that made me realize just how much hot water I could get myself into on this issue," says Enig, shuffling through files in the suburban Maryland offices of the consulting firm Enig and Associates, where she is director of the nutritional services division. Even at age 73, the semi-retired Enig manages to exude an air of industry and determination. She pulls out a folder now wilting with age and waves a 1978 article published in the *Journal of the Federation of American Societies for Experimental Biology*. In it, she argued that a major government report correlating cancer with saturated fats was, in fact, wrong. The data cited in the report showed a much stronger link between cancer and trans fats, asserted Enig, and deserved further study.

"Not too long after that, these two guys from the Institute of Shortening and Edible Oils—the trans fat lobby, basically—visited me and, boy, were they angry," she recalls. "They said they'd been keeping a careful watch to prevent articles like mine from coming out in the literature and didn't know how this horse had gotten out of the barn."

BY NOW MOST EVERYBODY has heard about trans fats. Present in a great many cookies, candies, cakes, crackers, margarines, and fried foods, they were all over the news last

July, when the Food and Drug Administration announced that, beginning in 2006, it would require manufacturers to print information about the substance on nutrition labels.

The decision came shortly after a report issued in 2002 by the National Academy of Sciences—the government's definitive authority on all matters scientific—revealed findings that were incontestably grim. Trans fats were found to raise the bad kind of cholesterol, called LDL, and to lower HDL, the good kind. In short, the NAS discovered, they cause heart disease.

And that may be the least of it. Dr. Walter Willett, a professor of epidemiology and nutrition at Harvard Medical School, who oversees the largest ongoing dietary study in America and is a recognized authority on trans fats, has found that for every 4 to 5 grams of trans fat you eat, your risk of heart disease nearly doubles. (He estimates that, on average, Americans consume some 5 to 6 grams of trans fats daily.) By Willett's calculation, of the half million Americans who die prematurely each year from heart disease—the leading cause of death in this country—at least 30,000 are killed by trans fats. Other studies have suggested (but not yet proven) significant links between trans fats and type 2 diabetes as well as asthma.

Some research suggests that fetal development—especially with respect to birth weight and the central nervous system—could also be adversely affected by trans fats, and that their presence in breast milk is detrimental to other, essential fats that keep babies healthy.

A **NOTHER EXILED FOOD ITEM.** It sometimes seems as if dietary guidelines are issued by a mercurial emperor. Saturated fats, once considered an angry terrorist to your arteries, are now considered by many scientists to be allies in some respects. Tropical oils, formerly the subject of full-page newspaper ads claiming that they practically kill on contact, are also being welcomed back into the fat fold.

Even more galling than the constantly changing information we get from so-called authorities, though, is the question of how something as harmful as trans fats managed to make its way into 40 percent of baked goods (cookies, crackers, cakes, etc.) despite warnings dating back nearly 50 years.

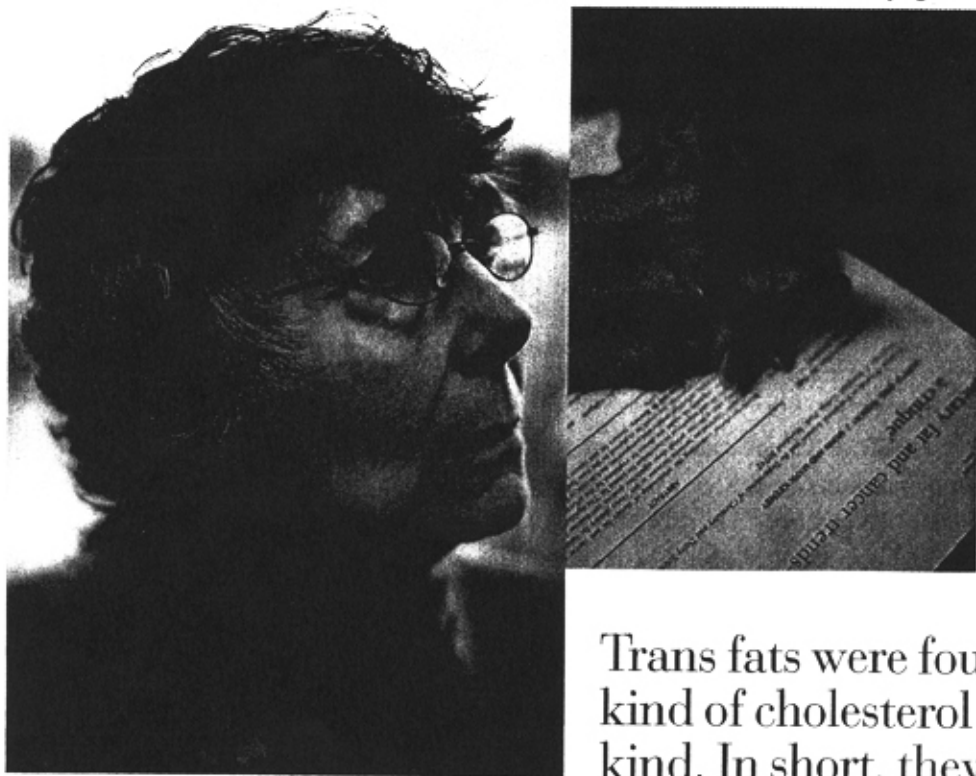
Trans fats are a multibillion dollar a year industry; companies that hydrogenate oils include Bunge Foods, Cargill, and Archer Daniels Midland. (And the list of manufacturers that use trans fats in their products accounts for almost every major company in the food

industry: Kraft, Nabisco, Kellogg, and Nestlé are just a few.) Many of the companies that hydrogenate are represented by the Institute of Shortening and Edible Oils, which for decades has been quietly working to squelch bad news about trans fats. As far back as 1968, the ISEO was mentioned in an internal memo written by the medical director of the American Heart Association: According to the memo, the ISEO objected to the AHA's intention to include a warning about trans fats in its dietary guidelines; subsequently, the AHA took it out. (No one at the agency has any recollection of this incident, and though Dr. Rose Marie Robertson, the AHA's current chief science officer, admits that the agency "often talks to the industry," she stresses that she "has never seen a corporate issue be a deciding factor in anything [she's] been involved in.")

"Even when I was a graduate student," says Enig, who didn't return to school until she had raised three kids and was in her thirties, "I couldn't understand why all these scientists, as well as the American Heart Association and the like, were all blaming saturated fats for the rise in heart disease." After all, she reasoned, heart disease started going up just as Americans were cutting back on butter. Enig figured the answer must lie elsewhere, possibly lurking in the foods Americans had been steered toward as a supposedly healthy alternative to butter: vegetable oils, margarine, more processed foods. "The trans fat question was just out there," she remembers, "and no one was studying it."

T **RANS FATS** came to America from—of all places—Germany, the land of pork sausage and Muenster cheese, a land famously unafraid of fat in all its glorious, natural variations. In 1901, after a French chemist had devised a way to alter matter by bombarding it with hydrogen atoms, a German scientist figured out how to apply that technology to convert oils into solids. These solid oils, called "partially hydrogenated," contain trans fats, and their debut as a food product came in the form of margarine.

"The trans fat question was just out there," remembers Enig, "and no one was studying it."



Trans fats were found to raise the bad kind of cholesterol and to lower the good kind. In short, they cause heart disease.

(Small amounts of trans fats are found naturally in foods like dairy products and meat, but they are chemically different and occur in such small amounts as to be almost negligible.)

Margarine did not get a warm welcome in this country in the early 1900s. The dairy and meat industries weren't keen to have it supplant butter and lard, then staples of the American diet. Many states responded to industry pressure by passing "margarine laws" that limited the sale and distribution of this new rival. Even the pleasant yellow color of margarine, made to mimic butter, was prohibited. (Early margarines came in white blocks, to evade the color ban, with a dye capsule that you had to knead into them.) But margarine, unlike butter, didn't melt on hot days and was, above all else, cheap. Following President Truman's abolition of the margarine laws, in 1950, margarine manufacturers began selling it as it appears today, in quantities that, since about 1970, have been twice those of butter.

One boon to margarine manufacturers was the growing consensus in the 1970s that saturated fats cause heart disease. Butter and lard were out. For the multitude of packaged products with saturated fats on the ingredient list, a replacement had to be found, and trans fats became the solution. They gave products both a long shelf life and the rich mouthfeel, as the industry calls it, that consumers like. Moreover, trans fats gave products an edge because they were cholesterol-free, another dietary priority to emerge in the '70s. Margarine manufacturers used the slogan "Healthy for Your Heart" and marketed the product like a drug to doctors.

HOW IS IT this line of thinking went unquestioned for so long? In Europe, Canada, and the U.S., a scattering of people pursued trans fats research from the 1960s on, but the studies were very expensive and, according to one researcher, "not very glamorous." More importantly, those taking on this stepchild of a topic had to deal with the tidal wave of industry pressure unleashed against them at meetings, conferences, and events. Their papers were rebutted with unusual ferocity, and their research funding was scarce.

Dr. Thomas Applewhite and Dr. J. Edward Hunter, industry scientists employed, respectively, by Kraft and Procter & Gamble (which held the original

TAKE THE TRANS FAT TEST

On a wet spring morning, Betsy Lichtenstein puts freshly baked chocolate chip scones on the table for me when I arrive at her small Manhattan apartment. I was introduced to her through a friend who told me that Betsy was unlikely to have a lot of trans fats in her kitchen since her gourmet cooking is a point of pride and she generally eschews Oreos for organic. For her kids, aged four and six, Betsy usually bakes cakes and muffins from scratch. Weight problems in the family have made diet a central topic. "I try to stay on top of the news about it all," she says with a sigh. "But it can be hard." She has only vaguely heard of trans fats.

We throw open the kitchen cabinets. Some of the obvious items she doesn't stock, like cookies, cake mix, pancake mix, and packaged snacks. But a big red box of Ritz crackers sits on a lower shelf. "These are a mainstay for my kids," she says. "They eat them by the handful."

So we look on the label. It proves terribly difficult to decipher. The FDA has mandated that food labels include a separate category for trans fats, but the rule doesn't take effect until 2006. In cases where the label lists mono- and polyunsaturated fats (in addition to the required saturated and total fats), you can estimate the trans fat content by taking the total fat content and subtracting out these other listed amounts. At this point, unfortunately, most labels—including the one on the Ritz box—don't provide enough information for you to make this calculation. (For now, the best way to avoid trans is to look at the ingredient list before you buy. If "hydrogenated," "partially hydrogenated," or "shortening" are near the top, you can assume that the trans fat content of the product is high.)

We turn instead to my cheat sheet. A printout from the Web site of the Center for Science in the Public Interest (cspinet.org), it indicates the amount of trans fats in a large number of popular food products. The verdict on the Ritz? One gram of trans for every five crackers.

"Oh, look at this one," says Betsy, shaking a bag of microwave popcorn. "Amazing—I don't even know why I have it. Six grams of trans fats."

A 1995 BBC documentary followed an English family for a day to see how much trans fat they ate. The family attempted to make healthy choices, such as a Beanburger rather than a hamburger for lunch at Burger King, and a Weight Watchers vegetable pie for dinner. At the end of the day, however, family members tallied up 10 to 15 grams of trans each. In the U.K., the government recommends eating no more than 5 grams a day. Yet 5 grams is a snap to eat; 5 grams is a doughnut.

Betsy looks a little disturbed by the tube of nail polish—pink frosting sitting on the middle shelf. "I usually make my own," she says. Frosting, according to my list, has about 26 grams of trans fats in every 16-ounce can. Betsy is appalled. "Wow," she says, "that's like a trans fat bomb." —N. T.

U.S. patent for trans fats), were the principal forces behind this criticism. Given that they worked for two food giants, the potential for bias was apparent, but their ability to fund research (as well as their own encyclopedic knowledge of the field) meant they could exercise considerable influence.

"Applewhite and Hunter worked behind the scenes," says Dr. Randall Wood, a professor emeritus at Texas A&M University who has researched trans fats. "I would say they had ways of finding out if a paper was going to be reviewed on a subject. There were papers, ironclad, indisputable evidence, and the reviews would be so negative. You'd get paranoid."

"Protecting trans fats from the taint of negative scientific findings was our charge," says Dr. Lars Wiedermann, who was a colleague of Applewhite's and who used to work for the American Soybean Association. (Soybean oil accounts for some 85 percent of trans fats.) "We spent lots of time, and lots of

money and energy, refuting this work."

One particular target was Dr. Fred Kummerow, a professor (now emeritus) at the University of Illinois who looked at the effects of trans fats on pigs. Wiedermann says he and Applewhite "chased [Kummerow] at three or four different conventions. And our objective was to sit in the audience, and when he stopped talking, to raise a lot of questions." Kummerow himself admits that his early work deserved criticism, but the intensity of the attacks "went beyond the sort of standard, respectful exchange you'd expect among scientists." It was enough to scare any tenure-seeking scientist away from the subject.

Enig, in her own needling, relentless way at conferences and through publications, provoked special ire from Applewhite. Knocking around her office, she pulls out another study. "After I submitted it [to the *Journal of the American College of Nutrition* in 1990]," she recalls, "Tom Applewhite called up the

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editor of the journal and tried to convince her not to publish my work."

"This was highly unusual," says Dr. Mildred Seelig, the publication's editor at the time. In fact, she can't recall another instance when she was similarly pressured. "I told him it was peer reviewed, and Mary Enig's work had passed muster."

For his part, Applewhite says he only asked to see the article before publication. Although he is now retired and 79 years old, he is palpably bitter on the topic of Enig. "I've written a lot on this subject, and I have very strong feelings. Mary Enig's research—no, just forget it. Don't waste your time with it. I pointed out that she was wrong, and that really made her angry." (Applewhite says he still disagrees with Enig's findings, and he refers to Willett's work as "just a bunch of nonsense.")

IN THE EARLY 1990S, two landmark studies more or less settled the argument on trans fats. The first, by Harvard's Willett, involved more than 90,000 nurses over a 10-year period, a size and scope that rendered his conclusions about trans fats and heart disease almost indisputable. But what Willett had demonstrated was correlation between the two, not direct causation. That crucial link was demonstrated, at about the same time, in a study on trans fats and blood cholesterol conducted by a pair of researchers in Holland, Dr. Ronald Mensink and Dr. Martijn Katan. By then, 30 years had passed since the earliest studies raising concerns about trans fats, and 20 since Enig had begun sounding the alarm.

It has taken nearly another decade for the FDA to act. According to an FDA insider, now retired, the agency knew of the issue as far back as the 1980s, when Enig and her colleagues at the University of Maryland alerted it to problems, but the agency "didn't pay any attention." In 1994, the FDA received a petition arguing for clear labeling of trans fats from the Center for Science in the Public Interest, an organization based in Washington, D.C., whose director of nutrition policy, Dr. Margo Wootan, claims that the agency's delayed response was "due to intense industry opposition." For the most part, she says, it was the Grocery Manufacturers of America, a food industry trade group, that "flew in hired scientists to rebut our statements at press conferences and say

that people shouldn't worry about trans fats." (Alison Kretser, director of scientific and nutrition policy at the GMA, will neither confirm nor deny Wootan's charges. "Our records on this," she explains, "are stored off-site.")

A particularly acerbic critic of the idea of regulations was the trans fat industry group. Even as late as 1995, ISEO president Robert Reeves said in an interview with the BBC that he saw nothing wrong with trans fats: "I'm confident they're safe in the diet at their current levels of consumption." (At the time, the ISEO estimated that Americans were eating 8 grams of trans fats a day—though Enig would argue that number was much higher.)

These sorts of tactics are hardly unusual, says Marion Nestle, author of *Food Politics* and professor of nutrition, food studies, and public health at New York University. "Of course the government's dietary guidelines are influenced by food companies. Food companies use all the usual routes to get their 'eat more' messages across. They submit studies and data supporting the benefits of their products. They testify at open hearings. They send materials directly to committee members. They also use their connections in Washington to lobby on behalf of their products."

The FDA says its delay on trans fats was due simply to being "distracted by other priorities." As a rule, though, the FDA is lethargic about slow-acting, long-standing threats, such as heart disease and cancer, and more agile about sudden scares like mad cow disease. Trans fat, as a substance that doesn't cause immediate problems, received the standard glacial treatment.

This year, Denmark became the first country in the world to ban industrial trans fats almost entirely, and the European Union may soon follow, according to Dr. Steen Stender, a professor of preventive cardiology at Gentofte University Hospital (near Copenhagen) and the main figure behind the Danish effort. "Our argument was: Why should it stay in the food supply since it's harmful in many ways and you can't mention one good thing that it does? Also, given that it's an industrial product to begin with, it is so easily removable."

Why indeed? And how to reconcile such information with the fact that in this country it's nearly impossible for anyone—especially children—to avoid trans fats? Most restaurants cook their

french fries in them (including McDonald's, which made a major announcement of the fact that it wouldn't but now says it has had trouble finding an acceptable replacement), and vending machines are larded with them.

Nestle says labeling will help: "The minute it goes on the label, it's out of the food supply. That's how food policy is done in this country."

Let's hope she'll prove correct. The FDA says that, in addition to including specific amounts of trans fats on all food labels, it is also considering adding a footnote that indicates a "daily recommended value" for trans fats, very likely a minuscule amount. Industry groups, however, have been resisting this mightily.

For the food companies, reformulating their recipes and modifying the production process to eliminate trans fats are monumental tasks, and convenient substitutes are hard to find. The most obvious choice, and the one European manufacturers are using, is palm oil, a solid at room temperature—yet for the American oil industry, this is a case of being hoisted by its own petard, since it ran a successful smear campaign against tropical oils in the 1980s in order to crush overseas competition. Now the public is convinced that tropical oils will stop up their arteries like cement mix, and that perception will be hard to change. Other trans fat alternatives are more expensive, such as genetically modifying plants to produce oils that don't need hydrogenation, and using a process called "interesterification"—a word that would seem to spare your arteries by clogging your palate—to create a new kind of fat. New synthetic fats, however, will also raise new safety concerns.

Almost every month, a food company announces its plans to make something trans fat-free. Frito-Lay, in a speedy and thorough overhaul, no longer uses trans fats in its chips; Kraft is reducing or eliminating them in its snack foods and cookies; and margarine now comes trans fat-free. Goldfish crackers also recently converted. Still, much of the food industry has kept silent about its intentions. What about all the trans fat in those deli doughnuts and cafeteria cakes? Plans are vague. "This is very different from Europe, where industry was open to change," says Katan. "The U.S. industry really dug in its heels. In the developed world," he adds, "they are the last to change over." ☞