Eggs

The Great Egg Panic

New proposals rekindle the debate over eggs' safety. But some scientists say the fears are overblown.

By EMILY GREEN, Times Staff Writer

New government proposals designed to check salmonella poisoning could force routine pasteurization or irradiation of the American egg supply.

However, the plans are derided as political window dressing by some of the nation's leading specialists in salmonella and eggs. They challenge the plans' root assumptions, from characterization of the pathogen, to numbers of people supposedly sickened, to what should be done that could actually improve food safety.

It is a classic stand-off, with nothing less than the future of what we eat, and how we eat it, in the balance.

Eggs, argues President Clinton, may kill hundreds and sicken as many as 300,000 Americans each year. The cost to the nation, he says, is $150 million to $870 million.

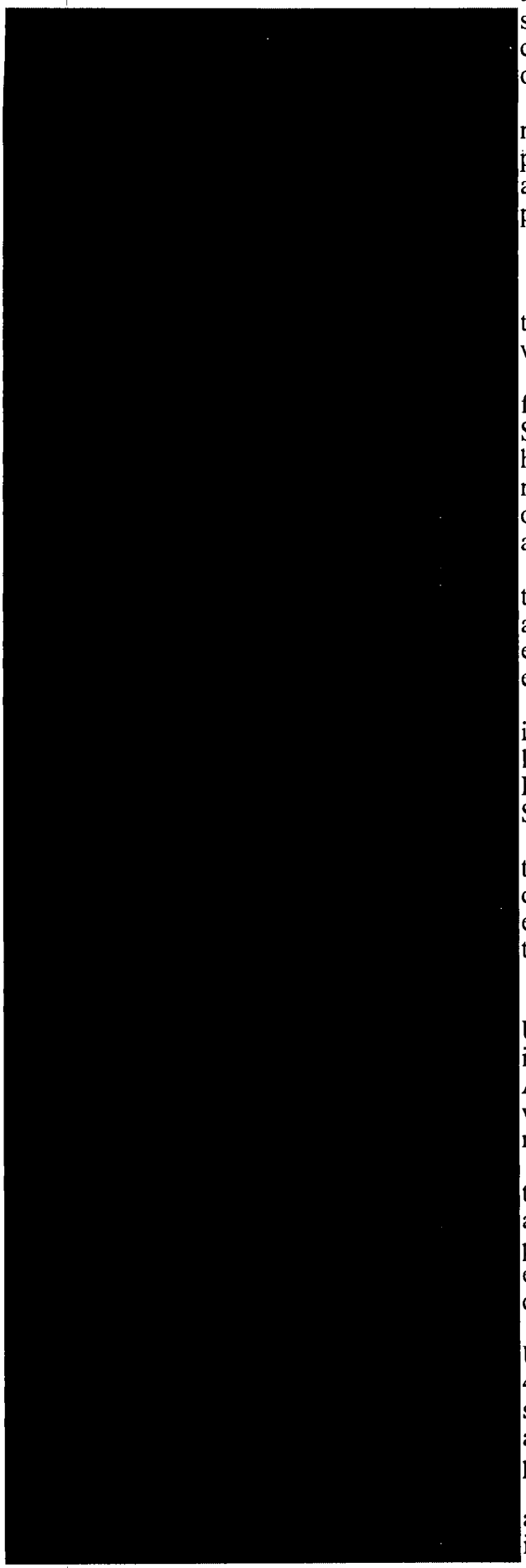
But one of Washington's most senior food safety advisors challenges the numbers. Peter Barton Hutt, a former chief counsel for the Food and Drug Administration, characterizes the statistical modeling that produces the food poisoning statistics as "the closest thing I can think of in this modern age to a Ouija board."

Meanwhile, in California, Sir Hans Riemann, a Danish-born research professor of food safety and epidemiology at UC Davis, describes himself as "very unhappy" at the President's report. He says that urgent meetings are now scheduled at Davis.

"It's very common for public agencies, when presented with some evidence, to respond that they have taken this and that position. It takes a lot of evidence to make them change their position to something else," he says.

"Of course that's understandable, because they don't want to look like they flip-flop. But it's unfortunate, especially if they are wrong."

The President's plan comes on the back of what, only last summer, had been a good year for the egg. American consumption of eggs had dropped by almost a third in the last 30 years, fueled by the



almost a third in the last 30 years, fueled by the suspicion that eating eggs can increase blood cholesterol levels. Last April, the egg was vindicated on that count.

Harvard University Medical School published results of a survey involving more than 100,000 people that showed "no overall significant association between egg consumption (up to 1 egg per day) and risk of chronic heart disease or stroke."

New Problems

Yet, almost instantly, the argument switched from the egg being too rich for our blood to charges that it was poisonous.

Today's egg, the new wisdom dictates, is too frequently contaminated with a bacterium called Salmonella enteritidis to be eaten as eggs always have been: sunny side up, in mayonnaise, cracked raw over hot pasta and grated with Parmesan cheese or simply soft-boiled and spooned worshipfully from a cup.

The FDA broadcast its recommendation in July that a tobacco-style label be placed on eggs warning against consumption raw or lightly cooked. Only eggs that are pasteurized or irradiated would be exempt.

In November, Sen. Dick Durbin (D-Ill.) introduced an egg safety bill, written along the label/test and pasteurize lines. By Christmas, President Clinton had delivered his 26-page "Egg Safety Action Plan."

This shifts responsibility for bacteria in food to the farmer. If even the manure on a chicken farm contains S. enteritidis, it is recommended that the eggs should be diverted to pasteurization. Eggs that test negative will still have to carry warnings.

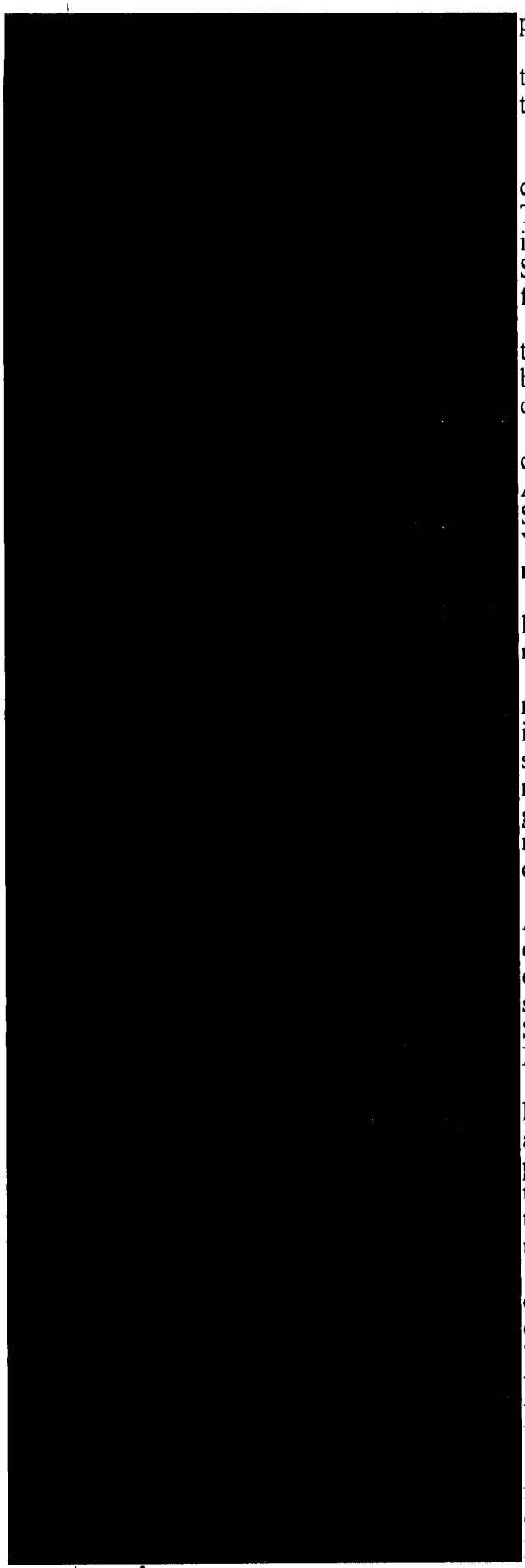
But are our eggs really a significant threat?

The arguments are by no means simple. Understanding them requires understanding the bug itself. Salmonella was discovered in 1887 by the American veterinarian Daniel Elmer Salmon. Today, we know salmonella is a large genus of bacteria, with more than 2,000 strains or serotypes.

Some are strictly human, such as typhoid (S. typhi). Others, benign for us, are lethal to rodents and are even used in rodenticides. Yet others, such as S. pullorum and S. gallinarum, are considered almost entirely diseases of birds. Many are adaptable and can find homes in most vertebrates.

John R. Roth, a professor of biology at the University of Utah, has been studying salmonella for 40 years. "It is mostly reported as a pathogen," he says, "but probably it exists in very many organisms at a low level where it's not a pathogen but living as part of the gut flora."

To his mind, the idea of banishing it is faintly absurd. "Salmonella is distributed pretty widely, and if you're willing to look closely enough, you'd



probably find it almost everywhere," he says.

"Sometimes it makes a mistake and gets across the gut wall and into an organism. . . . Then it has all these mechanisms for surviving known as virulence."

This happens in two ways. In the vast majority of cases, salmonella poisoning causes gastroenteritis. This is an irritation at the gut wall where one's immune system is fighting off the bacteria. Symptoms can range from a loose stool to more flu-like symptoms.

In a tiny minority of cases, the most serious ones, the infection is absorbed but not destroyed by white blood cells and is carried deep inside the body. These cases can be lethal.

There are simply no hard figures about how many cases of S. enteritidis poisoning occur each year. Among 270 million Americans, confirmed cases of S. enteritidis in humans run at about 40,000 a year. Yet the media regularly carry estimates of total cases ranging from 800,000 to 4 million.

Recently these were revised downward to more like 300,000, prompting farmers to joke that two more reports might eradicate it completely.

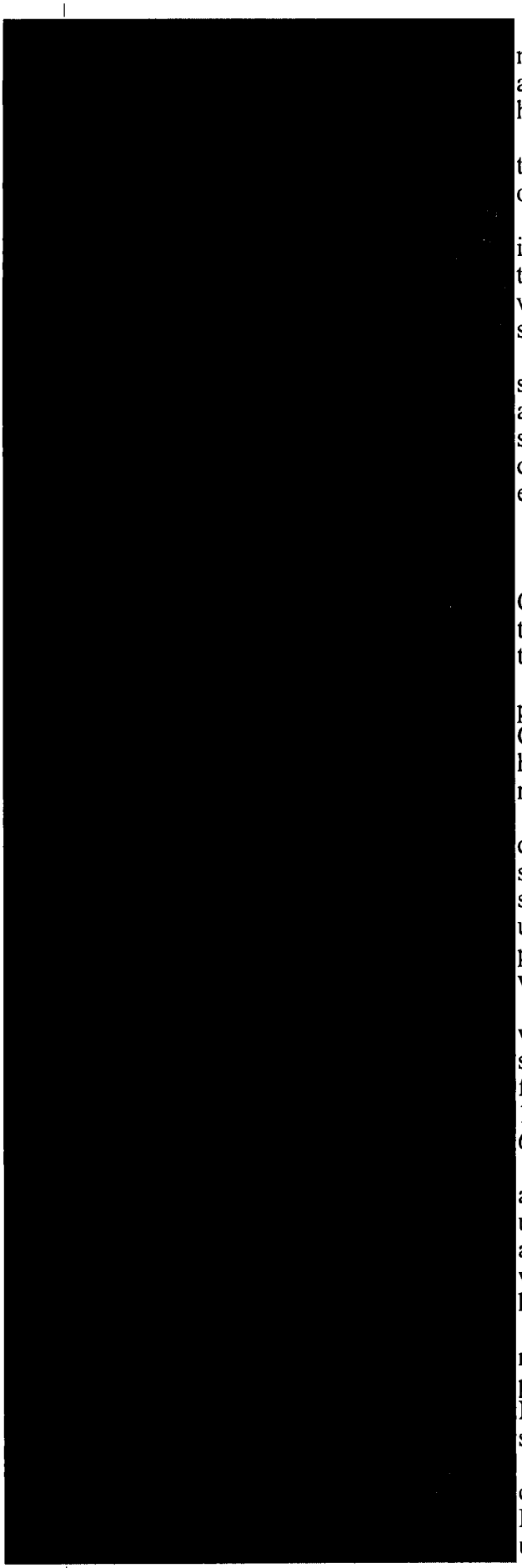
Peter Barton Hutt, formerly with the FDA and now a lecturer on food safety at Harvard University, is a long-standing critic of the numbers. "The statistics are all over the place," he says, "because none of them are any good. They are all wild guesses. What people do is gather statistics of reported cases and extrapolate from there. It then all depends on what multiple you choose."

The Centers for Disease Control and Prevention in Atlanta insists, however, that it has gone to a lot of effort refining the multiplier that it uses in extrapolating its estimates. "We think the number is somewhere around 38 times," says Dr. David Swerdlow, a medical epidemiologist in the CDC's Foodborne Disease Branch.

British food safety advisor Richard North wrote his doctoral thesis on the British S. enteritidis crisis and now works as a safety advisor for English egg producers. He dwells less on the numbers of cases than on their severity. "If cases are unreported, then the people who suffered cannot have been that terribly bothered, can they?" he asks.

But the CDC and others note that S. enteritidis can be deadly, even if with what they admit is extreme rarity. In the 14 years of the S. enteritidis "epidemic," from 1985 to 1998, there were 79 verified deaths. At a rate of about five deaths a year, this is one-tenth the number of people killed in the U.S. each year by lightning.

The figure remains low even after the CDC has multiplied it as part of the extrapolation. The agency calculates that S. enteritidis kills 225 Americans each year.



Most of the deaths occur among the disabled in nursing homes and hospitals. "It's more likely to kill a person who's elderly, or an infant, or someone who has an immune deficiency," Swerdlow says.

The question, in discussing how best to prevent these deaths, then becomes: Will S. enteritidis testing on farms save lives and prevent sickness?

Back at UC Davis, Riemann is skeptical. "I think it is probably premature to make very firm rules for testing with respect to eggs and egg products because we don't know enough about the ecology of salmonella."

Salmonella's behavior has long perplexed scientists like Riemann. "If you go back to the 1960s and look at the prevalence of different serotypes of salmonella isolated from humans, it goes up and down, and only in a very few cases have any explanations been found," he says.

The Latest Cycle

The '80s brought just such a shift. In 1988, the CDC noticed that a formerly dominant strain, S. typhimurium, was being supplanted by a new one, the S. enteritidis that is so troublesome today.

The CDC also saw a fivefold rise in food poisoning in the northeastern United States. Calculating that a certain percentage of the victims had eaten Grade A whole eggs, the CDC doctors reasoned that they must be the culprit.

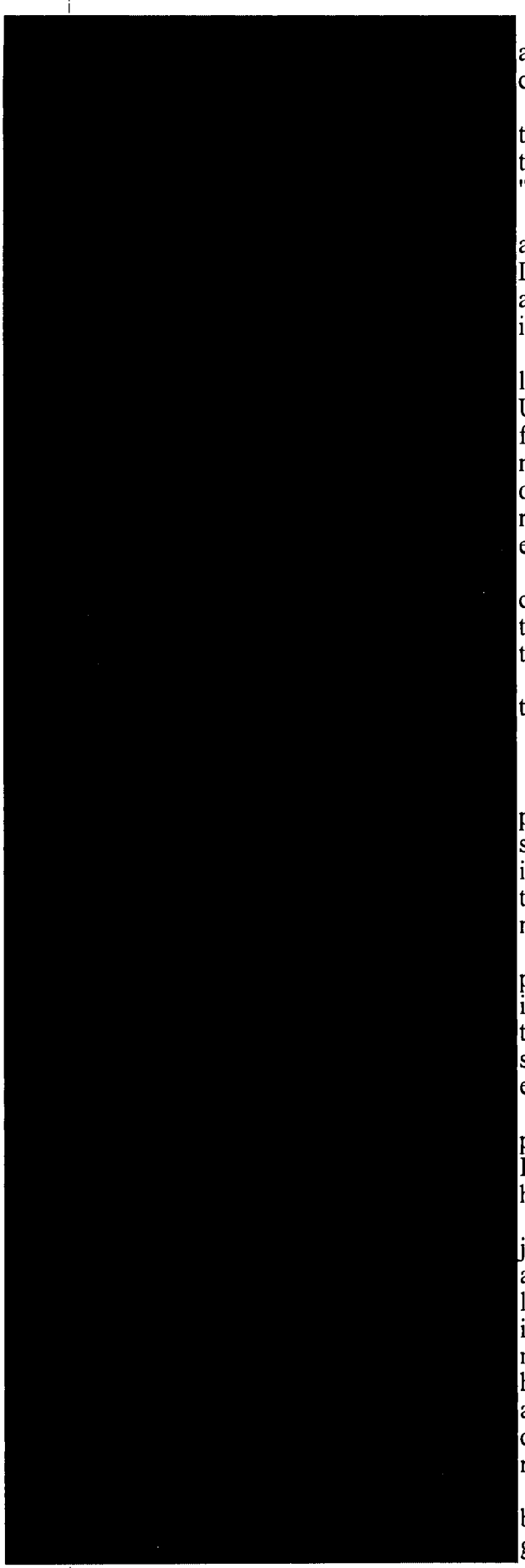
The CDC speculated that the increase might be coming from a particularly dangerous hen-adapted salmonella strain. If it infected the hen's reproductive systems, then it might be capable of infecting eggs underneath the shells. This meant that normal precautions, such as washing eggs at packing plants, would not control it.

The CDC also conceded that this theory might be wrong. S. enteritidis was not new; its incidence had simply risen. And, CDC doctors wrote, "our data are further limited in that for outbreaks reported between 1973 and 1984, no food vehicle was implicated in 64% of . . . outbreaks."

Another cause for uncertainty was the difficulty of attributing food poisoning to something so ubiquitous as eggs. Americans eat a lot of eggs, approximately 225 per person every year, so there was a great likelihood that anyone questioned would have eaten an egg before getting sick.

The rise in S. enteritidis in the late '80s in the northeastern United States was mirrored in Europe, particularly in the United Kingdom, Scandinavia and Eastern Europe. By 1994, for no obvious reason, it suddenly cropped up in Southern California.

The local outbreak was the S. enteritidis subtype, called "phage 4," which had been detected in European chicken flocks but which was previously unknown in U.S. poultry.



This meant that there was in fact no obvious agricultural source. But again, eggs were named as a chief suspect.

George West, a biologist and epidemiologist with the school of veterinary medicine at UC Davis, thinks the more obvious carriers of S. enteritidis are "10-fingered mammals called humans."

S. enteritidis' eruption in the Southland but absence in the northern half of the state prompted Davis researchers to look to Mexico. "Mexican authorities tell us that it's been a predominant human infection in Mexico for many years," West says.

The question of human involvement seemed more likely when, in 1994, Hilu Kinde, a researcher from UC Davis' Veterinary Diagnostic Laboratory System, found identical S. enteritidis phage types from municipal sewage outfalls serving housing developments, including one near an affected chicken ranch. As he continued testing, he found S. enteritidis-positive wildlife and feral cats.

The implication was that S. enteritidis was circulating from humans to creeks to wildlife and then, probably through mice, to chicken feed and then to hens.

Similar work done in Britain connected outbreaks to fields treated with sewage sludge.

The Campaign Continues

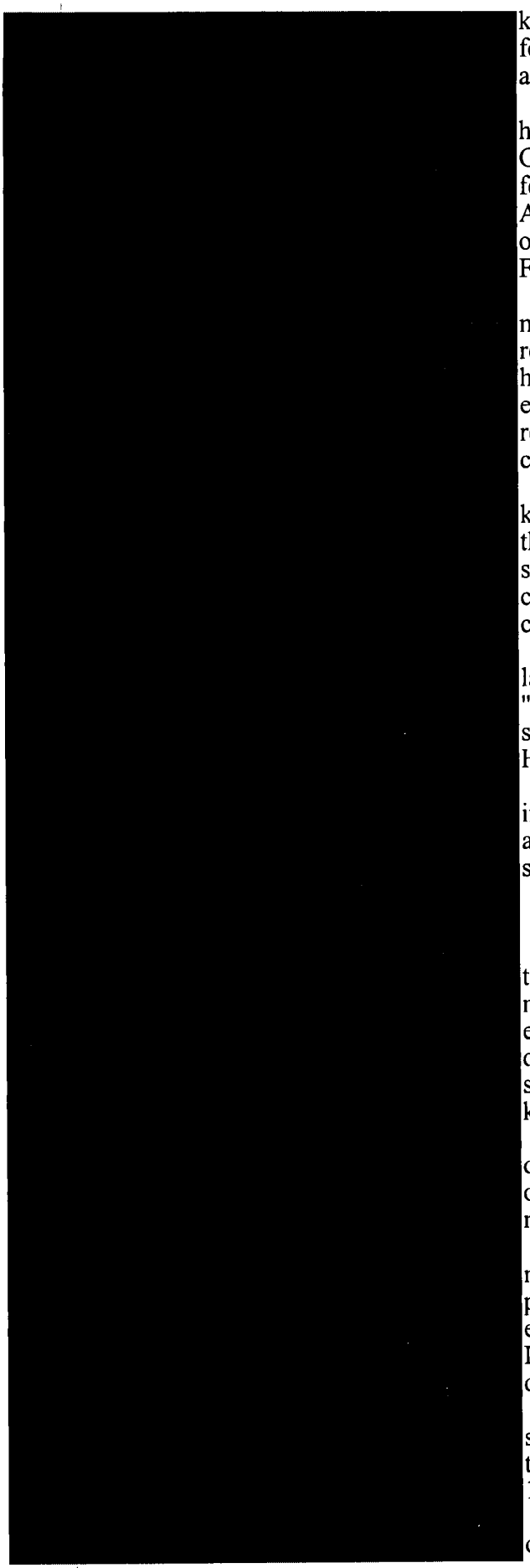
Though biologists found the Kinde model elegant, political campaigners didn't. If humans were a significant reservoir for S. enteritidis, and if it was indeed a widely dispersed environmental bacterium, then a simple system of on-farm controls would not necessarily stop S. enteritidis food poisoning.

Caroline Smith DeWaal is head of the food safety program at the Washington lobby Center for Science in the Public Interest. Though she cheerfully admits that she is not a scientist, doctor or qualified food safety advisor, she says she has spent a decade on the eggs issue, and she insists that Kinde is wrong.

"[S. enteritidis] isn't really an environmental pathogen," she says. "It is found in the inside of eggs. It is a specific strain that has adapted to reside in the hen's ovaries."

Furthermore, she insists that the culprit was not just bad eggs but bad government. She pointed the accusing finger in the 1997 report written by her lobby, "Scrambled Eggs": "The problem was identified by federal disease detectives in the mid-1980s. . . . With quick action, the problem might have stopped there. . . . But the numerous federal agencies with oversight responsibilities for eggs didn't act. . . . Meanwhile Salmonella enteritidis reached epidemic proportions."

The report coincided with a 1997 bill sponsored by Durbin, calling for what DeWaal saw as good government: a single food safety agency. "Eggs are



kind of the poster child for why we need a single food safety agency," she says, "because the products are so poorly regulated."

The Durbin bill failed. By last summer, however, he was again involved in food safety, this time with a General Accounting Office report in hand outlining federal inefficiency in supervising the egg industry. Advance copies were sent for comment to, among others, the U.S. Department of Agriculture and the Food and Drug Administration.

The FDA came in for the harshest criticisms, mainly to do with inefficient division of responsibilities but also over its failure to make safe handling instructions uniform and mandatory on eggs. Alerted to the content the very day the GAO report was published, the FDA announced its cigarette-style wording for a label.

It reads: "Eggs may contain harmful bacteria known to cause serious illness, especially in children, the elderly, and persons with weakened immune systems. For your protection: Keep eggs refrigerated; cook eggs until yolks are firm; and cook foods containing eggs thoroughly."

For others, such as Harvard's Hutt, a leader in labeling law, a message more along the lines of "Keep refrigerated and cook thoroughly" would be sufficient. Speaking from his Washington law office, Hutt calls the proposed label "unnecessarily scary."

"The label should give sensible handling instructions," he says, "which, I might add, I would apply to all raw agricultural commodities. Eggs should not be singled out."

Low-Risk or No-Risk

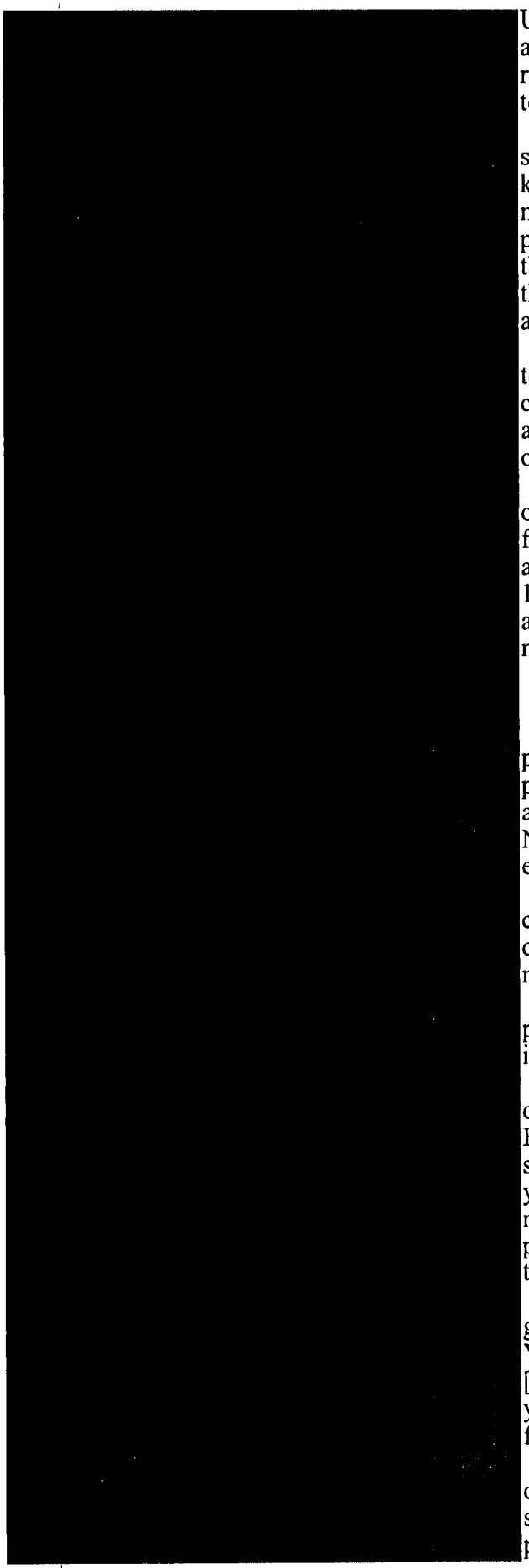
But those doing the singling argue that they are taking a low-risk food and making it lower-risk, even no-risk. Clinton declared that his plan might eradicate human S. enteritidis by 2010. Durbin declares "Our country has one of the safest egg supplies in the world. But we have the science and know-how to make it even safer."

Again, scientists dissent. UC Davis' West has dedicated much of his life to studying the physiology of the egg. "The egg is nature's most bulletproof, most perfectly packaged product," he says.

Yet a cornerstone of S. enteritidis politics is that nature's perfect package has been breached. Clinton's plan cites USDA estimates that one in every 20,000 eggs may be infected from within the shell. Like DeWaal, Clinton argues that this is a new development requiring new measures.

Those who specialize in salmonella disagree, saying this assault on in-shell contamination is more than a century late, that it was first spotted in the 1870s in the lab of Louis Pasteur.

Americans first became seriously interested in it during World War II. West has been looking at it at



UC Davis since the 1960s. And Riemann thinks that, although it does happen, it does so only in extremely rare cases. Hens with infected ovaries, he says, tend to stop laying.

He proposes that a more likely source of salmonella would be cross-contamination in the kitchen, when eggs are broken. Once their nutrient-rich yolks are spilled from behind layers of protective shell, membranes and albumin, he says they make "an excellent medium for [S. enteritidis] if these contents are contaminated from another source and kept at abuse temperature."

CDC data indicate that S. enteritidis poisonings tend to happen not so much in homes as in commercial kitchens, where eggs might be broken and left in a pool as a dip for French toast or as omelet mix.

Of 380 reported outbreaks during the peak period of the "epidemic," between 1985 and 1991, the CDC found that only 40 occurred in private kitchens. So, at the very height of the S. enteritidis crisis, out of 101 million American households, there were approximately six "outbreaks" (involving two or more people) confirmed each year.

Pasteurization No Cure?

Furthermore, if cross-contamination is the problem, pasteurizing the eggs probably offers no protection. "Using pasteurized eggs doesn't confer any significant degree of safety," says British advisor North. He adds that there have been nine S. enteritidis outbreaks in pasteurized eggs in Britain.

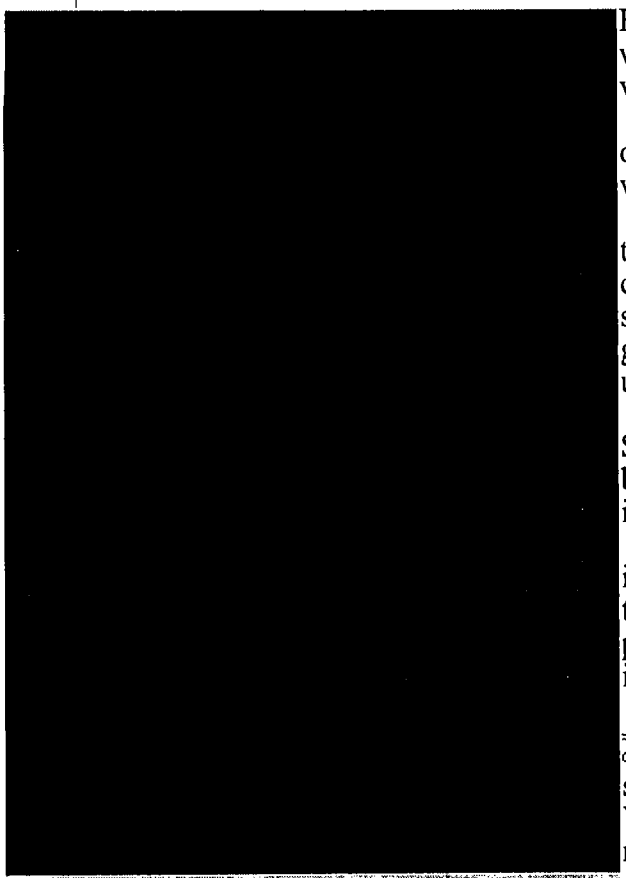
"It could even be harmful if people became complacent and said, 'Ah, these are pasteurized,' and don't take so much care. So pasteurization could do more damage than simple, basic hygiene measures."

However, it now seems inevitable that testing and pasteurization are on the horizon. Veterinarians now instruct farmers to prepare themselves for positives.

"Let's say you are an egg producer and you are doing all you can," says Ken Klippen of the United Egg Producers. "You buy birds that are salmonella-free. Before you put them in your house, you have it cleaned and sprayed with sanitizers. You refrigerate your eggs. You implement all the provisions of the quality assurance programs. And then a mouse gets into your farm.

"Mice are on farms. This is the way it is. A mouse gets in and he leaves behind one of his little pellets. You do a test, you pick up that pellet and you're [classed as salmonella-] positive. It doesn't mean that your chickens are positive. Regardless, when you find that, you have to divert the eggs."

Hutt, the former FDA official, thinks that overemphasis on "bio-security" in a barnyard is simply poor strategy. "What we've got to do is teach people how to handle food once it's off the farm.



How you handle the egg I am sure is important. But we're not going to change the farm. That's not a viable strategy."

He recalls a similar--unsuccessful--attempt to the one now proposed by Durbin and Clinton when he was at the FDA.

"We launched an offensive against salmonella on the farm, thinking naively that we could vastly change the pathogens that are found in barnyards," he says. "In the end, we did what any good government group would do. We declared it a success and shut up."

As a resounding irony, as mysteriously as it rose, S. enteritidis is already on the wane--right now, before the measures designed to save us have been implemented.

"It went down 26% last year, and they've no more idea as to why it went down as to why it went up in the first place," says North. "That's a worldwide phenomenon. You can't put this down to any national initiative."

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