

The writer fishing a fine pool on the Cumbrian Eamont, where the best fish lie right under the sandstone cliff.

A pool tail on the lower Eamont.

Fishing warm water Study: When water temps go up, the creel gets lighter

By NANCY KESSLER
Chronicle Staff Writer

Trout fishermen have known for years that the warmer the water, the worse the catch.

A recent study by Montana State University biologists Calvin Kaya and Geoffrey McMichael confirmed that knowledge scientifically by comparing catch rates on the Madison River on either side of the Ennis Reservoir.

But Kaya, a professor at MSU, did not attribute the lack of anglers' success below the reservoir to the reservoir itself — a shallow body of water long suspected of acting as a solar heating panel for lower Madison water.

He said a study in 1983 by other researchers indicated that removing the dam holding back the reservoir would decrease water temperatures in the lower section by only 1 to 3 degrees, while water temperature differences between the Madison above and below the dam at times reached 9 degrees.

Kaya and McMichael, a former graduate student, spent two summers collecting data on river temperatures and compared that with 1,700 anglers' success, determined through interviews.

The upper, cooler part of the river is near where the West Fork of the Madison empties

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into the main river, while the lower, warmer section was roughly 60 river miles to the north, near the Iron Bridge by Norris Campground.

Each study area was about six miles long, and were similarly flat sections that are readily accessible to the public and therefore heavily fished, Kaya said.

During the summers of 1987 and 1988, Kaya and McMichael water temperatures in the two sections ranged from 46 to 77 degrees, but averaged 7 to 9 degrees higher in the lower section, the researchers found.

When water in the lower section rose to 66 degrees or above, catch rates for both brown and rainbow trout fell below one fish every two hours. And when the water reached 68 degrees, more than half the anglers interviewed had not caught any trout, he said.

"As the temperature increased, the percentage of fishermen being skunked increased also," said Kaya. "The upper section did not reach those temperatures, so we did not have those lower catch rates."

Catch rates at all temperatures generally were higher near the West Fork, he said, possibly because catch-and-release fishing only is allowed there, and because of a greater density of rainbow trout than near Iron Bridge.

Kaya said laboratory studies indicate that when temperatures become uncomfortably warm for fish, "they no longer feel like eating," which his observations in the field confirmed.

For rainbow trout, he said, experiments have shown that energy available for anything other than basic metabolic requirements — such as breathing or heart activity — decreases between 68 and 77 degrees.

"The results indicate that daytime (water) temperatures in the mid-60s or lower are most favorable for supporting satisfactory catch rates of brown and rainbow trout," Kaya said.

"This study will strike some as obvious," he added, but how well fishermen do is an important part of the quality of fishery management, and the data wasn't there."

Kaya said the Ennis Reservoir is shallow enough to allow the entire body of water to heat up under the summer sun, which adds to the warmth of the downstream water. Other factors such as flow rate, amount of shade and distance from source also affect water temperature, he said.

"But water temperature is only one of many, many variables that can affect a fisherman's success rate," he said. "You have to take into account insect activity, and angler ability."

helped to shape. Cuomo got only a 53 percent majority in his New York gubernatorial race and was thus reminded of the handicaps facing an Eastern liberal.

Among the longer shots, Bradley was wounded in the New Jersey senatorial race after trying to be above it all; Gore and Simon won their senatorial seats by a big margin but trail memories of their lackluster showing in 1988; Wilder remained an intriguing possibility, but realistically only for vice president.

The list goes on but the announcements do not. Not a single serious candidate has officially declared, even though Democrats

"brought back in body bags" have made him a leading voice in the rising clamor over gulf policy. He is now in a position to outline the kind of post-Cold War vision that has long been absent from the Democratic agenda. Cuomo also has shown inclinations to present a revitalized American world view. These two Democrats, between them, could raise the intellectual level of presidential debate to heights not scaled since Adlai Stevenson.

The first presidential primary is only 15 months away. Let the candidates announce and the campaign begin.

— The Baltimore Sun

Letters to the editor policy

The Chronicle encourages letters from readers. Letters should be no more than 300 words, must be signed and must be addressed to the editor. Each letter must include the writer's address. Writers should include phone numbers, which will not be published but may be used for verification. The Chronicle reserves the right to edit all letters for length, grammar, good taste and libel. Thank you letters, letters written in poetic style or dominated by scripture quotations and letters written by students as a class assignment will not be printed.

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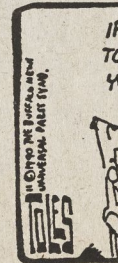
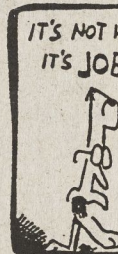
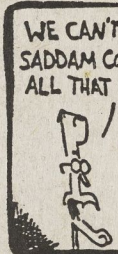
Errant missile story

In re-reading the news item in your Monday, Nov. 12, newspaper, I am compelled to relate my own experience with an "errant missile" while employed as a leading electronic technician GS-11 at one of four precision RCA FPS-16s at Headquarters Pacific Missile Range, Point Mugu, Calif.

On a particular day in the early 1950s, number two (0032) radar was the only FPS-16 on an operation involving aircraft (F-4s) firing live missiles (Sparrow IIIs &/or Sidewinders) at a drone jet target (Ryan Firebee or Q2C).

Number two radar was taking digital data and was set up on the plotting boards at the range operations building. I was tracking the same aircraft in radar number one (0031) but was not set up for the operation. This was normal procedure to maintain proficiency at our work.

The operation was terminated or scrubbed and the aircraft was returning to the Point Mugu airstrip from out over the Pacific Ocean when I observed a separation on my R-trace. I over rode my track and locked on the separation and broke into communications and informed range operations. The operator in number two radar



In the Drake Passage near Antarctica, a giant petrel flies low over the water, seeking crab and fish larvae that live in the ocean's nutrient-rich surface layer.

Tui de Roy: Hedgehog House

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See next page.

+ Lakes + Rivers

Where the Sea Meets the Sky

The ocean's skin is the richest, most extensive habitat of all

by John T. Hardy

Lakes too. Rivers.

Charles Darwin was fascinated by an explorer's account of an American black bear "swimming for hours with widely open mouth, thus catching, like a whale," thousands of insects, fish, and crustacean larvae that cluster near the water's surface. The bear that captured Darwin's imagination was exploiting an ecological niche that has only recently been studied: an immense, paper-thin habitat that blankets more than 71 percent of the earth.

Known as the sea surface microlayer, it is a remarkable "skin" that separates bodies of water from the surrounding atmosphere—the familiar dividing line between ocean and sky. Within this complex skin of the seas dwell thousands of species of plants, animals, and microbes, all attracted there by its special ability to nurture life.

Since 1989, I have been working with a team of marine biologists, chemists, and toxicologists at the Huxley College of Environmental Studies at Western Washington University investigating the biology and chemistry of the surface layer. On clear, relatively calm days, we have sampled waters as near as Puget Sound or as far away as the North Sea. Our collecting device is a barrel-sized, teflon-coated rotating drum towed alongside our research boat. Organic film from the water's surface layer adheres to this revolving cylinder and is continuously scraped by a squeegee into a large glass jar. Several quarts of the surface layer habitat can be collected by this method in just a few minutes. We also skim the surface with a special plankton net attached to pontoons, to collect samples of surface-dwelling crustaceans, fish eggs, and larvae.

Scientists have known for years that the thin aquatic surface layer teems with life. In 1917, a Swedish researcher of freshwater habitats, Ernst Naumann, coined the

term *neuston* to describe certain protozoans that use the surface film for support. His coinage was taken from the Greek *neustos*, which means "floating" but refers to many inhabitants of the upper few inches of oceans and lakes. Since Naumann's time, biologists have discovered scores of plants and animals, ranging from tiny bacteria and algae to large jellyfish and seaweeds, that live, reproduce, or feed within a few inches of the surface.

Bacteria adhere to the underside of the surface film, as do some unicellular protozoans that attach themselves with a special appendage. Fish eggs are packed with fat globules, which cause them to float in contact with the surface. Other organisms, such as snails and some jellyfish and seaweeds, entrap air bubbles and float on the film. Sargassum seaweed clusters in floating mats that nurture many small creatures, including baby sea turtles.

Along with the protozoans, a dense blanket of microalgae lives at the surface layer, attracted by both sunlight and the concentration of nutrients found there. Some microalgae actually migrate to the surface at midday and then descend many feet during the night.

Capitalizing on this concentration of biota, many seabirds make their living by skimming food from the water's surface (some are even called skimmers). One of the surface layer's main attractions for shearwaters, auklets, and petrels is that it provides an important nursery ground for numerous fish species: cod, sole, flounder, hake, menhaden, anchovy, mullet, flying fish, greenling, saury, rockfish, and halibut. The tremendous risk for so many fish larvae and eggs being so near the surface appears to be balanced by the abundance of food found there and perhaps the lack of predators that live in deeper waters.

The northeast Pacific, the U. S. conti-

nental shelf, and the North Sea are typical of rich fishery areas where dozens of fish species produce eggs or larvae that concentrate at the sea surface. In Puget Sound, English sole and sand sole spawn between January and April, releasing billions of eggs that float at the surface until they hatch, generally about a week after fertilization. Because of the buoyancy of their large yolk sacs, newly hatched larvae of these flatfish often float upside down near the surface.

The ocean's skin is also a vital habitat for many commercially important shellfish at certain stages of their life cycles. Crab and lobster larvae, for instance, seek the sunlight of the near-surface, where they feed on concentrations of minuscule life forms: the microalgae and protozoans. In Chesapeake Bay, 99 percent of blue crab larvae migrate to the surface layer and spend several days feeding there. After increasing in size, the larvae return to deeper waters, where they feed upon larger foods.

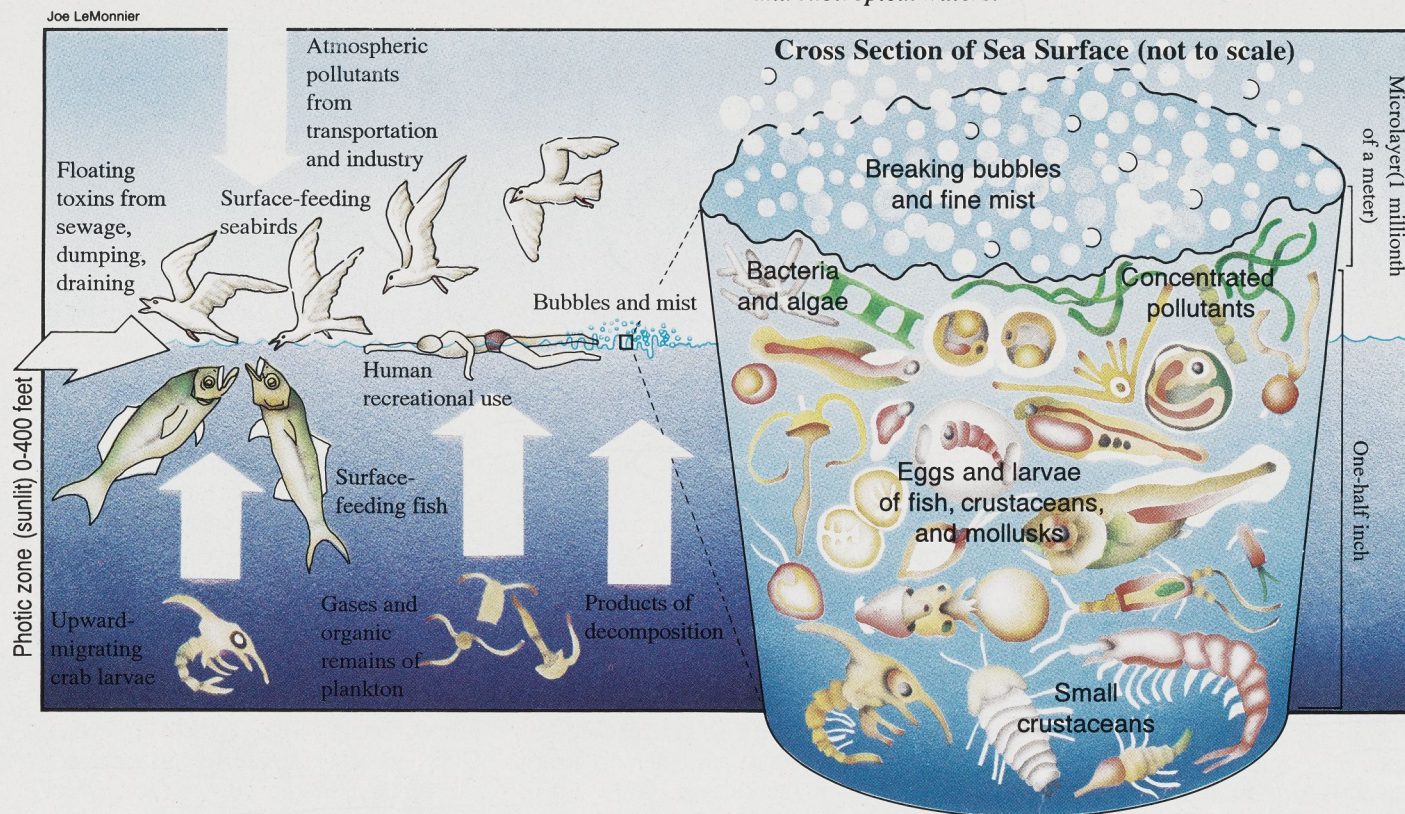
The extraordinary vitality of the sea's microlayer depends on special physical and chemical properties that are very different from those of the waters just below. The topmost three feet of water contains a whole series of sublayers, each with its own distinctive biological and chemical features. Within the surface layer (upper few feet), the first two-thousandths of an inch contains an especially dense concentration of minerals, chemicals, protozoans, and microorganisms. The upper few inches contain a greater density of larger organisms: fish eggs, fish larvae, and crustaceans. Larger, floating jellyfish and seaweeds may occupy the upper foot. The surface layer includes many transients, with plants and animals constantly migrating up and down.

The surfaces of both fresh and marine

dry + wet flies

The ocean's uppermost layer concentrates nutrients and toxins alike, below. Pollutants enter from sewage, drainage systems, or the atmosphere and are ingested by skimming birds, top-feeding fish, and sometimes, by human swimmers.

Right: A whale shark, the world's largest fish, scoops up tons of plankton from the surface layer. With gill arches modified to act as a sieve, it filters food from tropical and subtropical waters.



waters contain complex mixtures of chemicals that are often absent or greatly diluted at lower levels. Yet most of these natural compounds are derived from deeper-dwelling organisms. The billions of tiny plants and animals known as plankton occupy the sunlit photic zone, which may extend downward as far as 400 feet in the open ocean. The plankton excrete many organic compounds, such as amino acids, proteins, and fatty acids, that serve as nutrients for bacterial growth. Rising air bubbles capture these rich materials and carry them to the surface, where they become concentrated. When plankton die and disintegrate, some debris sinks to the bottom, but tons of cellular particles, along with oils, fats, and proteins, float to the surface.

Accumulation of these natural organic chemicals modifies the physical and optical properties of the sea surface. Thin organic films, invisible to the naked eye, are ubiquitous in lakes, oceans, and rivers. Where currents converge, these films merge and thicken; wave action some-

times makes them visible as "surface slicks." Strong surface tension acts on the slicks, resulting in a layer of sandwiched molecules, about as thick as a human hair, that resists turbulent mixing. This unique surface layer habitat even extends into the atmosphere. Just above the surface film, millions of bursting bubbles contribute to an aerosol blanket containing dense concentrations of both natural chemicals and man-made pollutants.

Metal ions, common in seawater, bind to the organic molecules and concentrate within the surface film, creating an environment that is very different from the subsurface waters. Some metal ions, such as iron, are necessary and useful to marine life; others, from human pollution, are poisonous. Such toxins as copper, lead, zinc, and cadmium, for instance, have been found in the microlayer in concentrations of 10 to 100 or more times greater than in the water below. Pesticides have been found in concentrations up to millions of times greater than in the rest of the water.

This complex aquatic surface is surpris-

ingly stable and can hold together despite buffeting by sixteen-knot winds and four-foot waves. According to Soviet biologist Yuri Zaitsev, fish eggs, larvae, and fry can cling tenaciously to the surface layer even in waves three to six feet high. Generally, winds strong enough to whip up whitecaps and cause surface mixing are not as widespread as often imagined, occurring on less than 5 percent of the earth's surface at any given time. Even when disturbed and mixed, visible surface slicks can re-form in less than an hour after the strong winds calm down.

Because of its unique tendency to collect and condense chemicals, this resilient surface habitat is increasingly threatened by a variety of human activities, particularly the dumping of industrial wastes and widespread atmospheric pollution. Some nonsoluble pollutants bind to buoyant particles and wind up concentrated within the surface microlayer. Contaminants that fall from a fouled atmosphere collect in the natural organic films. Like nutmeg powder sprinkled on an egg nog, such par-

WORLD

Can Undercut Care

Doctors can be led to bend rules or not do tests that might be embarrassing.

Minister, regularly took physician-prescribed amphetamines over a long period that included the Suez Canal crisis in 1956. Doctors attending President Kennedy and Adolf Hitler assisted in their abuse of amphetamines.

In grappling with the conflicts between elected officials' right to privacy about their health and the public's right to know, the participants heard about the complicity of doctors for Presidents Wilson and Franklin D. Roosevelt and other heads of state who helped keep the true nature of the leaders' illnesses from the public.

"The physician who treats a public figure must apply the principle of doing no harm to society as well as doing no harm to the patient," said Dr. Robert Robins, a professor of political science at Tulane University in New Orleans. He is writing a book on the political consequences of the ailments of leaders with Dr. Jerrold M. Post, a psychiatrist, who directed the program with Dr. Mark Smith, an emergency room physician. Although the course focused on the health of high-ranking political leaders, the issues and problems also apply to the care of business officials, celebrities and prominent citizens in communities across the country.

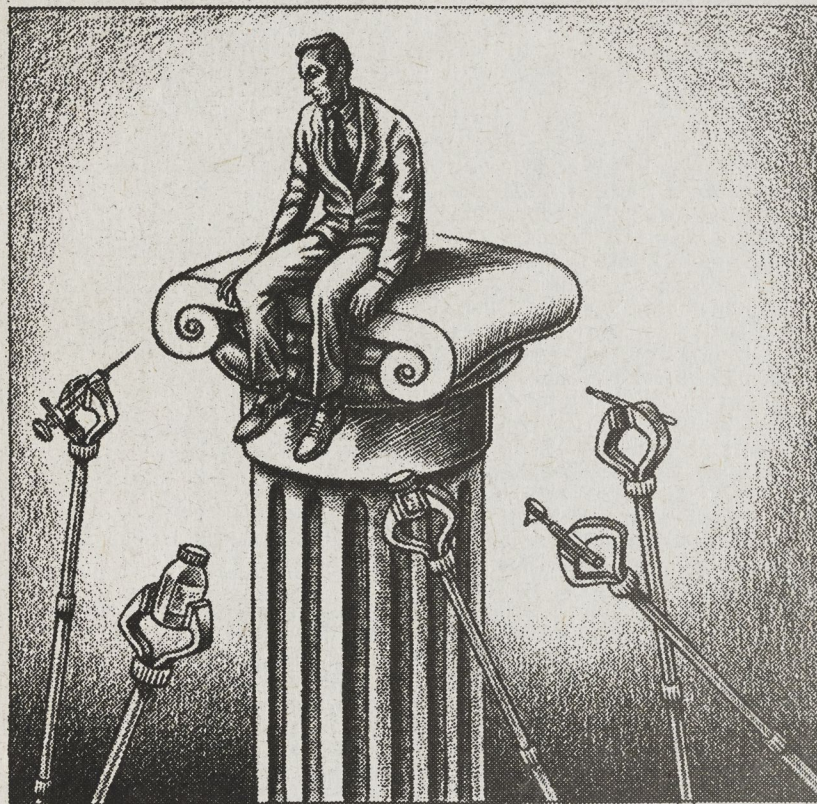
The common problems include the hazards in breaches of confidentiality, a doctor's desire to treat a prominent person to enhance his status and income, a hospital's use of publicity about its care of a such a person to help draw other patients and the chaos that can result in a hospital from admission of a prominent person.

Prominent people can include Presidents to mayors and famous actors to leaders in small communities. Some may be considered prominent at one hospital, but not another. All such patients have the capacity to disrupt a medical center's system so that they fail to receive the ordinary standard of care. The presence of a prominent person can also interfere with the care of other patients unless plans are made in advance.

Many prominent patients are assertive people with strong personalities who have enormous control over others in their office or work place. Such people often have difficulty in adjusting to the more passive role of hospital patient. They may demand changes in normal routine, and staff members are often mesmerized or intimidated into complying. Often these changes are harmful.

For example, prominent patients are often allowed more visitors for longer periods than hospital rules permit. But the hubbub of additional visitors can jeopardize their recovery. Also, some prominent people who try to create a healthy public image jeopardize their health by insisting on a premature discharge from the hospital.

Many prominent people insist on using false names when they are ad-



David Gothard

mitted to hospitals, particularly for treatment of substance abuse. Though the pseudonym may protect the person against public embarrassment, participants said such public anonymity could interfere with treatment by helping patients avoid confronting their problems.

But even when they submit to treatment, prominent patients may receive substandard care.

Without citing specific names, the

participants said that doctors, to avoid what they perceived as a procedure that could embarrass the patient, have been known to defer tests like a rectal examination and failed to detect a colon cancer when it could be cured. The participants said deaths have occurred because of such delays. Also, decisions usually made by the medical and nursing staffs are often kicked up to higher levels when a prominent patient is involved and

the resulting delays can be harmful.

Doctors have become embroiled in disputes over who will consult in a prominent person's case. Often the outcome is based more on medical politics than on expertise. Participants said that the honor of performing an operation on a famous patient went to a famous senior doctor, who had done the procedure only a few times in recent years instead of to a more junior doctor who did it every week.

In the emergency care of a prominent patient, by contrast, doctors have developed stage fright, being unable to carry out a procedure they do every day like inserting tubes into a vein. Others have seriously erred in recording blood pressures.

When doctors disagree about important aspects of the care of a famous patient or believe that standards are lowered, many do not resign from the case for fear such action would damage their reputations.

Yet doctors might avoid doing a high-risk procedure, even if it was a patient's only chance for survival.

George Washington Hospital officials opened the meeting by saying that there were prominent patients in the hospital virtually all the time.

When Johns Hopkins Medical School celebrated its centennial last year, officials issued a news release that described several famous people who had been treated by its doctors. They included actors, athletes, members of Congress and political leaders.

As the course made clear, a prominent person who is a patient at any hospital might pay attention to a surgeon who on being admitted to a hospital where he practiced, put a sign on his chest: "Treat me like an ordinary person."

Brain Cancer Rates Found Among Americans Under 45

People has been mounting at a rate of about 2 percent a year from 1973 to 1986, the last year for which data are available.

But other researchers attribute such if not all of any apparent rise to improved diagnosis, rather than to a genuine surge in the number of cases. Since the 1970's, the introduction of CAT scans and other advanced imaging devices have made it far easier for physicians to detect brain tumors at the earliest stages.

Debate Over Findings

"What is being proposed as a change in frequency is simply an improvement in diagnostic methods," said Dr. Leonard T. Kurland, an epidemiologist and neurologist at the Mayo Clinic in Rochester, Minn.

But Dr. Devra Lee Davis, scholar

Council in Washington and the lead author of the new report, insists that the rise is too great to be dismissed as the byproduct of improved diagnosis, although she said that she did not know why brain cancer was increasing among younger people. She, pointed out that other researchers have implicated electromagnetic radiation as a possible cause of brain tumors, but the theory remains fiercely disputed among scientists.

Dr. Davis said her immediate concern was to sound the alarm about the increase. She said she would leave it to others to determine its causes.

The latest paper arrives on the heels of a new volume that Dr. Davis helped edit and that is being published this week by the New York Academy of Science, "Trends in Can-

tries."

The book is a compilation of epidemiological studies of cancer rates throughout the industrialized world. The studies jointly conclude that the incidence of many cancers is mounting in the United States, Europe and Japan, especially among those over the age of 55. Spurring the upward trend, the book says, are rising rates of tumors of the brain, breast, kidney, bone marrow, skin and lymphatic system.

Many of the results from the new volume were announced last summer in the journal *Lancet* and elsewhere and were widely reported at the time. But the book offers several new and provocative details about a few of the cancer trends, and some researchers praised it for its attempt to synthesize disparate threads of epidemi-

"Davis pulled together a lot of interesting work and very bright people to present a convincing mosaic," said Dr. Philip J. Landrigan, chairman of community medicine and director of environmental and occupational medicine at Mount Sinai Medical Center in New York. "Now we have to get out there and do studies to figure out what's going on."

But other epidemiologists questioned many of the book's statistical methods.

Dr. Richard Peto, a renowned epidemiologist at Oxford University, said that beyond a spectacular rise in lung cancer deaths, there was no generalized increase in cancer mortality rates. "Some are going up and some are going down," he said. "The analysis as I see it in nonrespiratory cancer deaths is reassuring overall with

Among some of the new disclosures in the book is that far more men than women are dying from melanoma. The result is surprising because, at least in the United States, dermatologists worry that young women are at high risk of contracting the cancer as a result of excessive sunbathing.

Dr. Davis said that in all industrialized countries studied, the death rate for men was 40 percent greater than for women. She suggests that one explanation for the discrepancy is that men are more likely to be exposed to hazards in the work place. She specifically cited polychlorinated biphenyls, chemicals in electrical equipment that some scientists suspect may cause cancer.

But other researchers argue that the link between the chemical and melanoma—or any other disease—