Fish Fat Facts

Scientists say fish in the diet helps prevent coronary heart disease. Now it seems eating fish may also prevent certain cancers.

The fat in meat, fish and vegetable oils affects human health in a variety of ways. Red meats, for example, contain saturated fats that, in excess, may impair blood circulation and lead to coronary heart disease.

Nutrition scientist Rashida Karmali of Rutgers University says there is evidence that certain fatty acids in vegetable oils and meat may also lead to cancers of the breast, colon and prostate. These risky compounds, called omega 6 fatty acids, are found in sunflower, corn and safflower oil, ingredients common to the average American diet. As a nutritionist, Karmali is concerned.

The fact that we are eating 40 percent of our total calories as fat is too high. And we really should aim at reducing our fat intake down definitely to 30 percent, or even down to 20 percent, of the total calories if that is possible.

But Karmali also has good news: Fish oils contain a different set of fatty acids called omega 3. In animal studies, Karmali finds that these organic compounds probably counter the harmful effects of the omega 6 fats.

Karmali says we don't have to live by fish alone.

What is important is to have an optimal ratio of the different types of fatty acids from fish oil and from vegetable oil.

As a rule of thumb, the Rutgers nutrition scientist suggests that we eat fish at least once or twice a week while reducing the overall level of fat in our diets. ■ June 1986

Waiter, There's No Fly in My Soup

Dry-roasted grasshoppers, crickets in garlic sauce, or deep-fried caterpillars: In some parts of the world, insects are gourmet items.

Gene Defoliart says he's got a good recipe for a type of caterpillar.

They're about an inch long, I guess ..., white, hairless. You drop one of these into a deep-fat fryer, leave it for about 40 seconds, and pull it out and dip it in salt. It melts in your mouth and it tastes just like bacon.

Defoliart's testimonial may leave your taste buds rather cold. But the University of Wisconsin-Madison entomologist says insects are commonly eaten in many parts of the world.

You go to Africa or South America: In many places, in the indigenous populations, if you give them a choice, they prefer insects. You can keep the beef; they'll take the insects.

Defoliart says people in most non-European cultures eat at least some insects. In rural Japan, grasshoppers and bee larvae are a regular part of the diet. Japanese city dwellers wash their waterbugs down with a stiff drink. And in Thailand, gourmets consider grasshoppers the perfect snack alongside a beer.

But in many countries, insects are more than snacks. Some Brazilians depend heavily on bugs for protein. In Zaire, a central African country, insects make up a good 40 percent of the animal protein eaten by the average person, and with good reason: They are rich in protein, vitamins, minerals and calories.

Defoliart says little research has been done on the potential nutritional uses of insects, but he believes they could easily be mass-produced for food. In fact, he says, even migrating locusts could turn famine to feast in Africa if people simply caught and ate them. ■ February 1988
Bad Taste?

A United Nations economist says a growing taste for North American-style diets is partly to blame for malnutrition in the Third World.

Cassio Luiselli believes poor people in developing countries would eat better if they returned to more traditional diets. Influenced by North American eating habits, he says, these people are spending scarce money on meat, so-called junk food and alcohol.

Luiselli led a team of social scientists and nutrition experts in a two-year study of food and nutrition in Mexico commissioned by the Mexican government. They found that the country as a whole was fairly well fed, but significant pockets of poverty and malnutrition existed.

They traced the problem to a shift away from the traditional, low-cost diet of corn tortillas, squash, beans and rice to one of meat and potatoes. The newer diet, says Luiselli, is more expensive. It also includes some junk food, which gives people little real nutrition, so the poor are paying more and getting less.

The United Nations economist says it takes more energy and land to meet people’s protein needs with meat than with grains and vegetables. It also diverts farmland away from growing food for people to growing food for livestock, and that reduces the overall food supply available to the hungry and growing population.

The trend is not unique to Mexico. Luiselli says red meat and imported foods and beverages have become status symbols throughout the developing world. While he does not condemn imported tastes, he believes Third World countries should encourage their people to rediscover their traditional diets. Besides improving nutrition in those countries, it would make them more self-sufficient in food. And that, says Luiselli, is the surest way to strengthen their economies.

The High Cost of Carryouts

People in the United States waste enough edible food to feed all of Canada. So says an archaeologist who studies modern-day garbage.

It’s called the Garbage Project. For 13 years, University of Arizona archaeologist William Rathje and his students have sorted through household trash in Tucson, Milwaukee, and Marin County, California, in neighborhoods representing a cross-section of American consumers. Their purpose: to find out how much food we waste.

And Rathje says we waste a lot.

Our results indicate that, at least in the sample neighborhoods, the households are discarding between 10 and 15 percent of the solid food that they buy. At a national level it’s been estimated that we’re wasting $11.7 billion worth of food a year.

The Garbage Project has found that a third of the edible food thrown out is prepared but not eaten. The rest is unused whole items like produce and meat that spoil in the refrigerator. People apparently buy these items intending to prepare fresh meals. But after a long day at work, they often lose that ambition and opt for TV dinners or other packaged meals instead.

Even through recent recessions, says Rathje, the amount of food wasted has remained fairly constant.

Householders are just totally unaware of it, so even in times of great economic stress, when food is high-priced, people tend to waste a considerable quantity of food.

The Arizona archaeologist believes the average family could save $250 a year through better meal planning. If people then donated some of those savings to famine relief, says Rathje, they could pump new life into that old line about cleaning your plate because people are starving elsewhere.

June 1985

April 1986
This Spud's for You

Pity the poor potato. It's homely, it tastes a little bland, and its history is tarnished by the great Irish famine of the 1840s.

But do not underestimate the potato. It ranks right behind rice, wheat and corn as one of the world's most important foods. About 300 million tons are harvested annually in 130 countries. People eat far more potatoes than they do fish and meat. And animals eat a lot of potatoes, too.

Potatoes are not empty calories. Richard Sawyer, director of the International Potato Center in Lima, Peru, says the potato is second only to eggs as the most nutritionally balanced food. He says it has higher-quality protein than most crops, and its proportion of protein to carbohydrates is also high. That means it's not potatoes, but the butter, sour cream and cooking oil people eat with them, that are fattening.

Potatoes are good from the farmer's standpoint, too. Sawyer says they yield more volume per acre than any other crop. They can grow at both low and high altitudes. And they mature more quickly than rice, wheat or corn. Some varieties can be harvested in as little as two months after they are planted.

All this has made the potato an up-and-coming crop in many developing countries, where the balance between food supply and demand is precarious. However, the potato is still vulnerable to diseases and pests, especially in the tropics. And in some ways, it is more expensive to plant, store and transport than other crops. But scientists like Richard Sawyer are trying to work through these problems, and if they succeed, the humble potato may at last get the credit it deserves.

February 1983

Chemistry, Flavors and Fillets

New discoveries of the chemistry underlying fresh and spoiled fish flavors may lead to longer-lasting, better-tasting seafood products.

What makes fish taste fishy? Robert Lindsay can tell you. Lindsay is a food scientist at the University of Wisconsin-Madison, and he has identified the chemicals that give fish its taste—both good and bad. Lindsay says the processes that make fish taste fishy instead of fresh are preventable.

Two factors are responsible for bad-tasting fish: bacteria and the breakdown of fat in the fish's body through oxidation. Lindsay says most people have a very accurate seafood quality tester with them all the time: a nose. If you wonder how fresh it is, he suggests you take a sniff.

That's a very fair rule of thumb for anybody. If a fish product has a distinct fishy aroma, it has been oxidized or been subjected to some microbial growth and deterioration.

Lindsay says understanding the chemistry of fish flavors may help commercial seafood businesses package fish to keep it tasting fresh longer. It also may help nutritionists use fish oil in more food products without making the food taste fishy. And Lindsay says his work suggests that anglers can keep their fish tasting fresh by skimming their catches promptly, keeping slime from the fish skin from rubbing onto the fillets, and icing fish down.

Lindsay's findings come at a time when consumers are eating more fish. Fish oils apparently help reduce fatty deposits in blood vessels that may lead to heart problems, and research indicates that a regular diet of fish can help prevent certain types of cancer.

September 1987
Perilous Panic

What do SCUBA divers and firefighters have in common? They both depend on breathing devices for air. But sometimes those life-giving devices can be deadly.

SCUBA divers rely on portable air supplies to keep them alive. In a smoke-filled building, firefighters do, too. But ironically, their air masks or breathing regulators may sometimes be their downfall.

Some SCUBA divers and firefighters—no matter how experienced—occasionally panic with no apparent cause. It can happen in clear, shallow water with no present danger or on a routine inspection of a smoky house. This panic often causes the victims to believe they can’t breathe, and they tear off their life-giving supply of air, then drown or succumb to smoke.

Sport psychologist William Morgan at the University of Wisconsin-Madison believes divers and firefighters may soon be able to take a combined physiological and psychological test that would reveal susceptibility to panic attacks. The UW Sea Grant researcher says preliminary results indicate these tests may be accurate in up to 80 percent of all cases.

In our pilot work with beginning SCUBA students at the university, the psychological profiles have discriminated between those who’ve gone on to experience panic or near-panic behavior during the course of a semester and those who have not. So there is a lot of reason to believe what I’m suggesting is, in fact, possible.

Morgan says if he can accurately predict which people are likely to experience panic, they can quit diving or firefighting or they can learn psychological tricks to help them cope with panic if it happens. These techniques are easily learned, he says, and they may save a person’s life.

Threads with a Great Disposition

Crab shells may not keep patients in stitches, but they may keep stitches in patients.

When physicians sew up a cut, the thread they use is important. Thread made of natural fibers can cause the body to have an allergic reaction. Thread made of synthetic fibers can cause the body to react defensively and attack the stitches. And neither type of thread can be used to stitch, or suture, some parts of the body. A conventional suture in the urinary tract, for example, will dissolve before the wound heals.

But Sea Grant chemist Paul Austin of the University of Delaware recently discovered a suture material that does not dissolve readily in the body and is nonallergenic. The material is called chitin. Chitin forms the outer skeleton of insects and shellfish, and it is made up of long strands of sugar molecules that harden with age to give these organisms structure and protection.

Research at Columbia University showed that chitin had wound-healing properties, but no one knew how the medical industry could use it. In the meantime, the U.S. Environmental Protection Agency had banned ocean dumping of shellfish wastes. Crab shells, a prime source of chitin, were piling up beside crabmeat processing plants along Delaware’s coast.

Austin decided to put the crab shells and their healing properties to work. He found a way to dissolve and extract chitin from discarded crab shells and spin it into thread. He says experiments on animals show that chitin sutures are strong, nonallergenic and will not come untied. In addition, the Sea Grant chemist says thread made from chitin can be used anywhere in the body and will not dissolve until after the wound heals.

April 1987
The Smell of Success

A keen sense of smell was vital to the survival of early humans. Your nose is just as important today.

Trygg Engen says most people don’t realize how much their sense of smell tells them. Engen, a psychologist at Brown University in Rhode Island, is an expert on human responses to odors. He says you’re probably not aware of all the smells your nose picks up.

The sense of smell is something we use all the time but in a more or less unconscious fashion. We’re always noting the odor in a room or a building we walk into.

Engen says people usually don’t think about odors unless they’re strong ones. Cooking odors may remind you that you’re hungry; foul smells may prompt you to cut short a visit. Engen says these same responses probably gave early humans immediate information about what to eat and what to avoid in their environment. This natural warning system still runs strong. If you eat something and become ill, you don’t care to eat or even smell that food again.

Engen runs a hospital clinic for people who’ve lost their sense of smell. Their frustration goes beyond the meals they can’t taste or the flowers they can’t smell. They also miss the warnings that foul odors give, whether of spoiled food, a natural gas leak or a fire.

The psychologist adds that sensitivity to odors is also a problem for people in tightly insulated buildings.

Odor perception is becoming more and more of interest to air-conditioning engineers because when an odor smells bad, it’s likely to be contaminated. The fact is, there isn’t any much better index of it than that.

Put simply, things that smell bad are bad, and your body knows it. ■ December 1987

Get the Lead Out

Lead poisoning: It’s still a serious problem in the United States.

You’ve probably heard of lead poisoning as a problem that affects poor, inner-city children who eat peeling paint chips. But studies suggest the problem cuts across age and income levels throughout the United States.

Lead exists in soils and rocks everywhere. Although the human body has no use for lead, it normally contains a small amount. But high levels of lead in the body can cause irritability, nervous problems, miscarriages, high blood pressure, kidney failure and even death.

Lead contamination has many sources. Much of it comes from automobile exhaust and from old pipes and solder in household water systems. Lead is still found in some imported paints and in ceramic glazes used on dishes, even though importing such products is illegal.

Irene Mirkin, an epidemiologist with the Wisconsin Department of Health, says the amount of lead discharged into the environment has dropped because of pollution controls, but scientists now believe that even low lead levels cause problems.

The lead levels have gone down in this country over the past few years, and that doesn’t mean lead poisoning isn’t a problem, but it’s now more asymptomatic. Children may have lead poisoning, but they won’t show any clinical signs of it. It’s important to realize that somebody may not manifest any signs but still have lead poisoning, and that’s why screening is so important.

Mirkin says all children should be screened for lead with a simple and inexpensive blood test. If blood-lead levels are high, the source can often be identified and removed. Mirkin says you need to find out early because many problems caused by lead poisoning are not reversible.

■ December 1987
The Wrong Target

Summer weather means gardening, lawn care or field work for many people. A lot of them will use pesticides, but Walt Gojmerac, a University of Wisconsin-Extension entomologist, says these chemical poisons sometimes hit the wrong target. It may be just a simple mistake when they do, but it can have tragic consequences.

Gojmerac recalls an incident in which a Wisconsin brewery worker was accidentally poisoned because he brought a powerful herbicide home from work in a beer bottle.

His wife came along, saw this beer bottle on the window shelf, took it upstairs, put it in the refrigerator. Sometime later-I don't know the time sequence—he came in, opened up the beer bottle, took a swig out of it. He did not make it to the telephone to call the rescue squad. He was dead.

Gojmerac says the tragedy could have been avoided if the man had not put the herbicide in a common beverage bottle that did not have a special label.

He says people should follow a few special rules to keep pesticides on target: Read and follow the directions every time you use a pesticide.

Store pesticides in their original containers with the labels intact. Not only can that prevent an accident, but if one happens, doctors or rescue workers will know what they're treating.

Don't eat, drink or even smoke while using pesticides. The chemicals can get on your hands and in your food, and if they are supposed to kill pests, chances are good the chemicals could poison you as well.

Gojmerac says to be aware of animals and plants that might come in contact with pesticides and to avoid using them around children, livestock or pets. And when you are through using pesticides, clean your equipment, your clothing and yourself thoroughly. Remember that even in small amounts, pesticides can kill, and it pays to handle them with caution.

Underwater Relief

Soft coral from Caribbean waters may promise relief from pain.

In tropical waters, soft coral abounds in vibrant colors of red, white and purple. It lacks the rigid outer coating of hard coral, so it must rely on chemical defenses to protect itself from predators.

Three Sea Grant scientists from California and New York believe the defensive chemicals these animals use may someday help yield new drugs. The scientists recently discovered that one type of rare soft coral found only in the Bahamas and Florida Keys contains a unique class of compounds that relieve inflammation—the pain and swelling of body tissue and joints. Oceanographer William Fenical of the University of California in San Diego says experiments with mice showed these compounds contain anti-inflammatory agents stronger than the most commonly prescribed drugs. He says the compounds also act in unique ways to relieve the pain associated with swelling.

These findings may lead to the development of new drugs for treating inflammatory conditions. Fenical says the compounds are nontoxic, but it will still take time before they can be synthesized and new drugs are developed from them.

We don't know the side effects. The side effects may take years to understand—if there are any. At the moment, we see little or nothing to be worried about. But this is very early testing, and it will require at least 10 years of very thorough testing before we'll have any feelings for side effects.

The Sea Grant researchers hope the compounds can provide new insight into how inflammation occurs and someday provide new sources of relief to those who suffer pain.

May 1984
Homemade Air Pollution

You can't hide from air pollution. Studies have shown that toxic chemical levels may be higher inside your home than outside.

People spend an average of 22 hours a day indoors. That's not good, according to an environmental scientist at the Harvard School of Public Health in Boston. Lance Wallace says toxic chemical levels in the air are often higher indoors than out. Wallace says there are probably thousands of sources of air pollution in an average home. They range from cigarette smoking to hot showers, which release chlorine at five times the levels found outdoors. Wallace says other major sources of indoor pollution are consumer products, such as paints and cleansers, and building materials like adhesives and insulation.

Air stays inside the average home for about an hour before fresh air from outdoors replaces it. In that time, pollutants accumulate and become more concentrated. In the case of carcinogens, Wallace says, the higher the concentration, the greater the risk of cancer.

Wallace says indoor air pollution levels are independent of levels outside. Rural homes tested by the U.S. Environmental Protection Agency contained just as much pollution as urban homes in New Jersey. Wallace believes most indoor pollution originates within homes, and he suggests ways to reduce it.

There's several things one can do. Obviously, the simplest is to open a window, even in New Jersey. According to our study, that's better for you in the long run. There are times when you can't, and in those cases, the best thing to do is to take the sources out of the house if possible.

Wallace emphasizes that these are mostly temporary measures. He suggests that the government set safety standards to help ensure a healthy indoor environment.

Catching Ultraviolet Rays

The popularity of outdoor summer activities and the advent of skimpier bathing suits have led to an increase in skin cancer in the United States.

Over the past 50 years, Americans have increasingly turned to swimming, fishing, boating and just plain sunbathing for summer recreation. Swimwear has gradually gotten skimpier, and a deep tan has come to represent affluence, fashion and health. But dermatologists consider one resulting trend quite unhealthy—the rising rate of skin cancer in the United States.

Derek Cripps, head of the Dermatology Clinic at the University of Wisconsin Hospital in Madison, says overexposure to the sun produces the worst form of skin cancer, malignant melanoma.

It seems that we're seeing it in areas of the body that normally used to be protected. If you look at the swimming trunks, swimming costumes—well, at one time, they were maybe to their ankles, and now they're so brief that you can hardly see them, and there is a rising incidence of malignant melanoma.

Scientists believe melanoma is caused by long-term exposure to the ultraviolet rays in sunlight, which damage the genetic material of skin cells. Melanoma often first appears on the skin as a blemish or an irregularly shaped mole. According to Cripps, people with fair complexions and red, blond or light-brown hair face the greatest risk of sunburn and skin cancer from too much sunlight.

Cripps, who helped develop the protection rating system for sun screen creams and oils for the U.S. Food and Drug Administration, says melanoma can be fatal if not diagnosed early and treated promptly. The best cure, he says, is prevention: Use sunscreen, wear a hat, and—if you burn easily—put on protective clothing. And, he adds, consult a physician if an irregular mole or blemish suddenly appears on your skin.
Lighten Up

Does winter give you the blahs? Maybe you should lighten up.

Many people get mildly depressed in winter and blame it on cabin fever. But some people get severely depressed. Scientists call the problem seasonal affective disorder, or SAD.

Neuroscientist George Brainard of Jefferson Medical College in Philadelphia describes the symptoms:

- Decreased libido, decrease in physical energy accompanied by feelings of fatigue, increase in appetite and increase in carbohydrate craving--and that's often followed by weight gain, much as a hibernating bear would go out and eat a lot more before it slept off the winter--and an increase in sleepiness and increase in sleep time.

Although researchers are not sure what causes winter depression, they're finding out that more light may help some of its victims. Brainard advises SAD people to cheer up because their problem is probably a physical one that many psychiatrists can treat with light therapy.

Psychiatrist Norman Rosenthal of the National Institute of Mental Health in Maryland says light directly affects the brain. Rosenthal treats his SAD patients with bright lights to make up for the short days of winter. He believes people who get mildly depressed in winter might need only more light in their surroundings.

But Brainard cautions depressed people not to treat themselves with bright light that could damage their eyes. He says most people could simply take walks outdoors because even when it's cloudy, daylight is much brighter than most indoor lighting.

Those who don't like to venture outside in winter needn't despair. Brainard says special therapeutic lights may soon be available in stores.

Smoke Alarm

Tobacco smoking is a hazard to nonsmokers as well as smokers, according to recent studies.

Although cigarette smoking in the United States is on the decline, more and more people are dying each year of lung cancer linked to smoking. And the victims are not all smokers.

The acting director of the U.S. Office of Smoking and Health, Donald Shopland, says passive smokers--those who breathe in smoke from someone else's cigarettes--stand a strong chance of developing lung cancer, too.

The majority of studies are actually showing that nonsmokers who are exposed do tend to be at a higher risk for developing and dying of lung cancer.

The most recently published study from the American Cancer Society indicates that women who are exposed to heavy amounts of tobacco smoke from their husbands' smoking are twice as likely to develop lung cancer as women who are not exposed in this way.

Shopland says studies also have clearly shown young children are more susceptible to respiratory problems if their parents smoke at home.

But there's hope for the nonsmoking majority, at least in public places. Only a third of all adults in the United States now smoke cigarettes--down from 43 percent two decades ago. Shopland says 40 states now have laws that limit smoking in public places, and most smokers accept them.

There have been a number of surveys published, not only by people like the American Lung Association but even by the Tobacco Institute, that have shown over and over again that even the majority of smokers accept reasonable restrictions for smoking in public places.

Shopland says unwanted smoke in the air is no longer considered merely annoying to nonsmokers; it's now recognized as a potential threat to their health.
Gut Reaction

The crystal-clear mountain stream that beckons thirsty hikers and campers to drink could cause months of intestinal distress.

As many as 16 million Americans are thought to be infected with the parasitic microorganism known as giardia. Giardiasis causes intestinal cramps, bloating and diarrhea that can last for months. The parasite interferes with the body’s ability to absorb nutrients, resulting in weight loss and weakness.

Dr. Dennis Maki, an infectious-disease specialist at the University of Wisconsin Hospital and Clinics in Madison, says although giardiasis has been around throughout human history, its infectious cysts have recently shown up in unexpected places.

We think of crystal-clear, pure streams in the Rocky Mountains. There’s contamination by giardia cysts. And it’s recently been found that in other mammals, such as beavers and muskrats, the parasite is able to infect these animals, and they can be a reservoir for infection and contamination of the water supply.

Maki says more than 60 giardiasis epidemics broke out in the United States in the past decade, mostly because of breakdowns in the purification of municipal water supplies. But he says common-sense measures could prevent many of the individual cases he regularly sees.

Anybody who is going camping, particularly in the Rocky Mountains area, and is going to drink the water in the lakes or streams would be well advised to either boil the water or to pretreat it with halazone tablets.

Halazone is an iodine compound available at most pharmacies.

Maki says people traveling to developing countries should take similar precautions. And he stresses that even in many industrialized countries, such as the Soviet Union, giardia contamination of the drinking water is alarmingly common.

The Big Chill

Victims of hypothermia require special treatment if they are to survive the big chill.

Recently, a 10-year-old Massachusetts boy was pulled from an icy pond two hours after he fell in. He barely had a pulse, and his temperature was just over 70 degrees Fahrenheit. Unfortunately, the boy didn’t make it; he died, a victim of acute hypothermia-low body temperature.

Someone who falls into cold water will begin to suffer from hypothermia within minutes. And though it takes longer, it can also affect persons exposed to the cold on land.

According to Jim Lubner, University of Wisconsin Sea Grant field agent, a hypothermia victim, before losing consciousness, will quickly lose motor control and then become confused. Lubner says this confusion will often cause the victim to resist help.

Nonetheless, rescuers should persevere and get a hypothermia victim out of wet clothing and make him or her as warm as possible. Above all, Lubner says, handle the victim with care and do not rub and massage arms and legs to circulate blood.

A hypothermia victim often is in a very fragile state, and jostling that person may lead to cardiac problems. In any event, it’s going to force the body to push warm blood out to the extremities before it wants to do that.

Lubner says if medical aid is more than a half hour away, rescuers should try to rewarm a hypothermia victim themselves. The best way, the Sea Grant agent says, is to crawl into a sleeping bag with the victim and share body heat. And, he adds, do not give alcohol to someone suffering from hypothermia. ■ January 1986
8: People and Society
Sea Talk
In the old days, being shanghaied to the boon-docks was not much fun. But minding your Ps and Qs could make you a proper jack tar.

The English language owes many of its common expressions—such as “minding your Ps and Qs,” “knowing the ropes” and being “three sheets to the wind”—to seafarers and sailors. Familiar words like bootlegging, posh, scuttlebutt and sky-larking also have their origins in the language of the sea.

For example, the expression “tapping the admiral” means having a drink. It dates back to the battle of Trafalgar when Admiral Horatio Nelson was mortally wounded by a musket ball. Rather than being buried at sea, he was preserved in a barrel of rum and shipped back to England. When the barrel was finally opened, the admiral was there but the rum was gone.

“Mind your P's and Q's” was originally a warning to a drunken sailor. In his home port, a sailor usually had a charge account at the local tavern. The bartender would keep a tally of pints and quarts of beer the sailor consumed, writing P for pints and Q for quarts on a chalkboard. If a sailor didn’t keep his wits about him, he might pay for more quarts than he actually drank.

Sailors were sometimes called “jack tars” because they wore their hair long and secured it in a pigtail with tar. The large bib that sailors wear on their backs today came about originally to keep tar off their shirts.

The word “posh” is also seafaring jargon. Actually an acronym, it stood for port out and starboard home. This indicated on what side of the ship distinguished people should have their cabins for maximum shade.

And finally, the expression “knowing the ropes” was one way a captain could describe what a sailor had learned on the journey. But in those days the expression meant the opposite of what it means today. It was another way of saying that the sailor had learned practically nothing.

An Anthropologist’s Dilemma

Anthropologists who study primitive cultures have a problem: Should they help remote tribal communities cope with threats to their traditional ways of life?

Cultural anthropologists usually try to live quietly among the tribes they study. They hope the people will not react to an alien presence and begin to alter their customs, beliefs and practices.

But anthropologists find it difficult not to take part in community life. After an outbreak of measles, a compassionate scientist may give vaccinations. If a child falls into a fire, a scientist may end up treating the victim with modern medicines instead of standing back and observing more primitive treatment and attitudes.

But the dilemma is even more far-reaching. Should an anthropologist intervene on the tribe’s behalf if land and mineral exploitation threatens tribal lands?

John Yellen is an anthropologist at the National Science Foundation in Washington, D.C. Yellen notes that logging, mining and agricultural development threaten to deprive 200,000 Indians living in the jungles of Brazil of their land and traditional way of life.

Very often you end up with a moral dilemma: On the one hand, you think, ‘Gee, I want to leave things alone’; on the other hand, you see things happening that you’re concerned about and you think shouldn’t be happening.

Yellen says several loose-knit organizations of anthropologists are trying to address this concern. One group called Cultural Survival, based at Harvard University, has helped persuade the World Bank to fund only development projects that are compatible with the welfare of indigenous peoples.

But anthropologists still face the dilemma: When should they stop being quiet observers and intervene in the lives of the people they study?
**Flat Earth Flattery**

The theory that the world is flat never had a big following, even in 1492.

When Christopher Columbus sailed west from Spain five centuries ago, people thought the world was flat and ships would fall off its edge if they crossed the Atlantic Ocean. That's what many of us learned in grade school, and it's a gross exaggeration.

University of Wisconsin-Madison geographer David Woodward says few medieval scholars actually believed the Earth was flat. But he says we have all heard that theory because of offbeat intellectuals from the Middle Ages.

Two of them, prominent Christian scholars named Cosmas and Lactantius, said the Earth was flat, the Bible proved their claim, and anything to the contrary was heresy.

Woodward says we have all heard about their theory because they were unusual, not because their views were well received.

We know about people like Cosmas because the historians have tended to emphasize the unusual in the medieval period. In fact, during his own day, Cosmas was regarded as a second-rate scholar. So here is an example of an erroneous idea being blown up out of all proportion because it happens to be of interest to historians, but it does not reflect the main thread of thinking about the shape of the world and the distribution of earth and water on its surface during the Middle Ages.

Woodward is compiling a six-volume history of map making. The idea that the Earth was spherical began with the ancient Greeks, Woodward says, and it did not die out during the Middle Ages. He says the myth that the flat-Earth theory was once widely believed began with a biography of Christopher Columbus written in the early 1800s. ■ May 1988

**The Mystery of the Mounds**

High atop the Mississippi River bluffs near Marquette, Iowa, lies one of the ancient mysteries of the upper Mississippi Valley—the centuries-old Indian mounds at Effigy Mounds National Monument.

Nearly 200 prehistoric mounds have been preserved by the National Park Service. Twenty-nine are effigy mounds, intriguing banks of soil built in the shape of birds and animals. Who built them, and why?

The effigies were built between 600 A.D. and 1400 A.D. in parts of Iowa, Wisconsin, Minnesota and Illinois. Of the 3,000 to 4,000 constructed, only about 20 percent still exist.

The mound builders were nomadic woodland people who lived in small family groups and wandered across the countryside, living off the land. One family may not have traveled more than 10 or 15 miles in an entire lifetime. Why they built the effigies remains a mystery, but there are some tantalizing clues.

Most effigies are found near major sources of water, the first places where food would appear in the spring. And the emblematic mounds are found only in a zone of transition between the prairies of the South and West and the great forests of the North and East. Here the two environments mixed together, providing a large supply of plants and animals for food. Outside this zone of transition, effigies are simply not found.

It's thought the effigies may have served a religious purpose. Some were used for burial, but others contain no human remains or artifacts. What is known is that the mound builders disappeared from the Mississippi River valley about 150 years before the first European explorers arrived, taking the secrets of the mounds with them. Where they went, and why, no one knows.

■ March 1983
Travel Expenses

The way Americans get around costs us more than we think.

City buses, passenger trains and other forms of public transit are frequent targets of budget cutters who resent having to subsidize them. Likewise, taxpayers sometimes consider bicycle lanes and even sidewalks luxuries.

But Mark Hanson says if people took a hard look at the public costs of getting around in private cars, they might see things differently. Hanson is an assistant professor of environmental studies and urban planning at the University of Wisconsin-Madison. He estimates that for every vehicle on the road in Wisconsin, state taxpayers shell out more than $100 a year just to build and maintain highways and enforce traffic laws. That does not count vehicle registration fees and gasoline taxes.

Hanson’s estimate does not include public expenditures on air pollution, traffic accidents, health care for the injured, and other indirect costs of car travel. All this adds up to what Hanson considers a whopping subsidy of its own.

When I look at discussions of what we should do about mass transit or bicycles or walking, provisions for pedestrians or whatever, I’d like to see the different modes—this includes light rail—put on a level playing field. If we want to subsidize the automobile at the level we’re doing it, then let’s subsidize all the other modes and then let them compete. If we want to get rid of the bus subsidy, fine, let’s get rid of the subsidy for all the other modes as well and then see what happens.

Hanson says putting all forms of transportation on “a level playing field,” as he puts it, might change the way Americans choose to get around.

June 1987

Building a Science

Half a century ago, wildlife managers relied more on good intentions than on hard science. But in just a few years, one man changed that.

No science can trace its roots back to just one person. But wildlife ecology can come close. At the turn of the century, no field of science dealt with the relations between animals, land and people. There were fields like zoology and geography, but nothing that combined them. Then, in the late 1920s and early 30s, Aldo Leopold fused these distinct fields into a new discipline—wildlife ecology. This year is the hundredth anniversary of Leopold’s birth.

Though he was trained as a forester, Leopold’s years with the U.S. Forest Service crystallized his ideas about the relations between people, land and wildlife. In 1933, Leopold put those observations into a book titled Game Management. This was the critical thesis around which wildlife ecology grew.

Robert McCabe, a retired professor of wildlife ecology at the University of Wisconsin-Madison, was one of Leopold’s early graduate students. He describes Leopold’s influence:

He is regarded as the father of wildlife management. He was in on almost every aspect of the development of game management thought. And his book really coalesced all of these ideas. And today, the basic concepts of that book are as good as they were the day they were written. All that has happened is that in the intervening years we’ve produced scientific data to support those concepts.

In 1939, the University of Wisconsin-Madison created the first Department of Wildlife Management in the world; it was later renamed the Department of Wildlife Ecology. Aldo Leopold was its first professor. March 1987
The Snowflake Man

There's a unique old farmhouse in the hills of northern Vermont, distinguished from all the rest by a large metal snowflake at the peak of its roof. This is the house where Wilson Bentley made photographic and scientific history by taking the world's first picture of a snowflake almost 100 years ago.

Bentley's remarkable technique has never been matched. Working in an unheated shed, he would sift through a collection of flakes, spear a perfect crystal and transfer it to a microscope slide. Careful never to breathe on the delicate specimen, he would rapidly slip it under his microscope-camera and take a picture. During his lifetime, Bentley photographed more than 5,000 snowflakes. The prints have been used not only by scientists but also by jewelers and designers.

Whatever inspired a shy dairy farmer to dedicate his life to the cold pursuit of snow? Amy Hunt, Bentley's niece, says her uncle's infatuation with snowflakes began at the age of 15 when his mother gave him a microscope.

When he noticed them with his microscope, he thought that they were so beautiful. And he said that they'd come from 'cloudland' and that was God's gift to the world, to enjoy these beautiful snowflakes.

Mrs. Hunt, who is 84 years old, fondly remembers her uncle's perseverance.

He never would give up until he got his perfect snowflake, which was in 1885, when he did his first one. My folks were in Florida at the time, and they were trying to get him to go down, but no way, he couldn't leave that snow.

There's an ironic twist to the story of the man who became known as Snowflake Bentley. After a lifetime of fascination with snow, he died of pneumonia in the winter of 1931—an illness that some say he got walking home in a blizzard.

A Parks Pioneer

What better monument could there be to a man who believed nature rejuvenates the human spirit than a lush, beautiful park?

There are many such monuments to Frederick Law Olmsted. He designed some of the nation's best-known parks, and a century later, they remain a tribute to his uncommon foresight.

Olmsted was born in Hartford, Connecticut, in 1822, the son of a well-to-do merchant. He tried his hand at engineering, farming, writing and publishing. But he made his biggest mark as America's first landscape architect.

In the late 1850s, Olmsted and a partner turned 840 acres of swamp, rocks and hills into a now-familiar landmark, New York's Central Park. There had been city parks before, but none of this magnitude or beauty. It was an instant success. Twenty-five thousand people a day flocked in to relax and play as soon as it was completed.

Olmsted firmly believed city dwellers in this young but rapidly growing nation needed large, natural, open spaces to relieve the pressures of civilized life. He lobbied hard to protect such places, and he won many supporters. Eventually, he was asked to design and supervise the creation of more than three dozen major parks in cities ranging from Boston to Louisville to Milwaukee.

Always, Olmsted chose to work in harmony with the landscape rather than against it. He insisted on lots of greenery. He liked curving paths and roads with new vistas at each turn. He tried to keep buildings from intruding.

Perhaps most important, Olmsted believed in looking to the future. He sowed seeds not just for his contemporaries but for many generations to reap.

February 1983
**Leap of Faith**

A 17th century pioneer in anatomy and geology spurned fame and fortune to minister to Europe’s poor.

Today’s science stands on a foundation laid in the 17th century. Scientists such as Galileo, Newton and Halley replaced speculative and mystical notions with experimentation and proof. But they were often caught between their discoveries, powerful church authorities and their own religious convictions. As Galileo found at his trial by the Inquisition, science and religion were not always compatible.

Another casualty of this conflict was Nicolaus Steno, a devout Danish scholar born in 1638. In his early twenties, Steno traveled around Europe demonstrating his skills in dissection and his knowledge of human anatomy. He was the first to accurately describe the workings of the glands, muscles and heart. His reputation earned him the admiration and financial support of Italian royalty.

That royal interest led to another of Steno’s scientific achievements. When a duke sent him a shark’s head to study in 1665, Steno noticed that the shark’s teeth resembled fossils he had seen in the Italian countryside. To explain how those teeth and other marine animal parts became sealed in rock, Steno established fundamental principles of geology.

This was no small feat in the 1600s. Only the Biblical account of the earth’s history was widely accepted in Europe, and fossils were not thought to have come from living things. Some historians say this conflict raged in Steno’s own mind and ultimately drove him to the Church. He became a priest at age 36 and preached among the poor of northern Europe. He never practiced science again, but even in his short career, Nicolaus Steno pioneered careful methods of observation essential to modern science. ■ June 1986

**The Tree Huggers of India**

More than 250 years ago, a young girl in India threw her arms around a tree in desperation. Shielding the tree with her body, she hoped to prevent the maharajah’s axemen from cutting it down. Instead, the girl and 363 other protesting villagers were themselves felled before the maharajah stopped the slaughter.

These early martyrs of forest conservation inspired what was called the chipko movement. In India, “chipko” means “to embrace.”

Today, population pressures and a desperate need for timber and fuel are causing the forests of northern India to be over-harvested. For these same reasons, neighboring Nepal is currently losing about 3 percent of its forests each year. A United Nations study predicts this trend will turn the mountainous regions of these two countries into desert and bring flooding to central India by the end of the century.

In response, a modern version of the chipko movement has sprung up. For 20 years, the present-day chipkos—mostly women—have been demonstrating against the loss of forests in northern India. These women and their children have been literally hugging trees to stop the axes and chainsaws from cutting them down. The chipkos also urge massive tree-planting programs to provide jobs, restore the forests and anchor the eroding soil.

All this has earned the respect of the Indian government, and forest clearing has been suspended temporarily in some regions.

Other tropical forests such as those in South America and Africa are also threatened. This year the World Wildlife Fund and the International Union for Conservation of Nature is campaigning to save the world’s forests. Helping to lead the way are the chipko tree huggers of northern India. ■ March 1982
A Matter of Proportions

A leading environmental scientist says population is growing fastest in parts of the world that can least support it.

After years of slow but steady decline, the world population growth rate rose last year. A private organization called the Population Reference Bureau in Washington, D.C., says the growth rate now stands at 2.8 percent a year. It may not sound like much, but at that rate world population would double to more than 10 billion by the year 2030. And most of the additional people would live in impoverished developing nations.

Peter Raven directs the Missouri Botanical Garden in St. Louis and is a leading spokesman on international environmental issues. He says citizens of industrialized countries must understand that they’re members of a fast-shrinking minority.

For somebody born in 1950 in an industrial country, there would have been two people living outside of industrial countries for one of him or her. At the end of that person’s life, or toward the end, in 2020, there will be five people living outside the industrialized countries of the world for every one of them.

Raven says those numbers do not bode well for the 20 percent of the world’s population that currently enjoys a high standard of living.

That’s a change in global proportions, which makes the fact that we in the industrialized countries control about 80 percent of the total gross national product of the world, about 80 percent of the industrial energy, and about 80 to 95 percent of all the materials that go to make up the standard of living, a serious inequity and one that will have increasingly obvious repercussions.

Raven says those repercussions include increasing tensions between the haves and have-nots of the world.

Feeling the Strain

“Short of thermonuclear war itself, population growth is the gravest issue the world faces over the decades immediately ahead.”

The words are those of Robert McNamara, former U.S. defense secretary and retired president of the World Bank. But the idea is shared by many people concerned about international development.

Leaders of Third World countries such as Egypt, India, Mexico and the Philippines worry openly that population may be their biggest obstacle to security and prosperity. The population of these and other developing countries has doubled since World War II and probably will double again in the next 17 to 35 years. McNamara and others say industrial nations like the United States cannot turn their backs on the problem. Its ripple effects are felt throughout the world. Countries that cannot support their populations often fall into deep foreign debt; suffer high unemployment, food shortages and poor living conditions; and see the gap between the rich and the poor grow wider.

Social scientists warn that those conditions give rise to the sort of political turmoil, both domestic and international, that’s so evident today in Latin America and Africa. And this turmoil threatens the security of the rest of the world.

When ecologists like Paul Ehrlich first warned of a ticking “population bomb” in the early 1970s, they expressed the problem largely in biological terms. There was a limit, they said, to the number of people the Earth could hold, and when the population reached that limit, there would be widespread famine, disease and death.

It seems now that the dangers of overpopulation are much more complicated. Whether or not there’s a biological “upper limit,” the world’s economic, social and political systems all feel the strain of too many people.

May 1987

January 1984
Crisis? What Crisis?

End of the world getting you down? Simon says, “Relax.”

Julian Simon angers environmentalists when he says the world is not overpopulated, is not dangerously polluted, and will not run out of resources. In fact, Simon, a University of Maryland business professor, believes quite the opposite. He claims that more people mean more producers and consumers to fire up the economy and more brains to think up new ways to solve problems and create new things. Put them in a free market, he says, and prices and profits will ensure a steady supply of the good life.

His critics call Simon's ideas fairy tales. They say he overlooks evidence that parts of the world have more people than they can feed and that many nonrenewable resources are being depleted. But Simon considers dire warnings about the environment unnecessarily gloomy.

I'm not saying that all is well everywhere, and I don't predict that all will be rosy in the future: Children are hungry and sick, people live out lives of physical and intellectual poverty and lack of opportunity, war or some new pollution may finish us off. What I am saying is that for most relevant economic matters that I've checked, the aggregate trends are improving rather than deteriorating; not that things are good, but that they've been getting better.

And they're getting better, says Simon, because people throughout history have struggled to make them better. He says the evidence is all around: Pollution levels are dropping, and raw materials are getting more affordable all the time. If resources were getting more scarce, he asks, how could their prices go down? Environmentalists say Simon uses only those facts and figures that support his case. Simon denies that and insists that people always find a way to get by. He says he has faith that they'll continue to do so.

The Promise

Biotechnology, which makes it possible to change the genetic makeup of living cells, is barely a decade old. But scientists say it promises to revolutionize medicine, agriculture and industry.

By transferring genes from one cell to another, scientists can endow living organisms with new abilities. Implanting the gene that produces human insulin in a bacterium, for example, has made it possible to easily and cheaply mass-produce insulin, which is so important to diabetics.

Richard Burgess, director of the University of Wisconsin-Madison's new Biotechnology Center, says genetic engineering holds unlimited potential.

We can do things now that we couldn't dream of doing several years ago. Almost anything you can imagine doing that involves a gene-isolating a gene, changing a gene, expressing that gene at high levels, purifying the enzymes-anything you can think about doing is feasible.

Burgess, a cancer researcher, says biotechnology has triggered a revolution in the diagnosis of certain diseases. And he expects new, more effective treatments to follow, including, perhaps, a cure for cancer. He also thinks farms and factories will soon benefit from genetic engineering. Burgess says more productive crops and nonpolluting industrial processes are on the horizon.

Despite all the promise of biotechnology, critics have raised questions about its potential for negative environmental, social and economic repercussions. Some have even challenged the ethics of transferring genes between species.

Burgess believes most of their fears are exaggerated. He says scientists have proceeded with caution because the potential for good in biotechnology far outweighs the risks.
Miracle or Nightmare?

Scientific miracle or impending nightmare? Jeremy Rifkin says genetic engineering spells trouble. Some scientists claim biotechnology could one day eliminate disease and starvation. Economist and author Jeremy Rifkin says these goals are admirable, but he questions the wisdom of tampering with nature’s designs.

I believe each species has an essential nature, an integrity, a self-worth that’s imprinted into its genetic code, and that it is irresponsible of us to attempt to rearrange those codes after millions of years of natural development.

Rifkin, whose lawsuits have delayed several genetic research projects, claims biotechnology is reducing life to a set of design principles. And it raises some troubling questions. What are the criteria, for example, for what is a good and a bad gene? Efficiency? National security? Those are cultural values, not biological rules. Then the ultimate question is raised: Who do we entrust with the authority of deciding what is a good and bad gene?

Rifkin’s critics point out that nature has produced hardships such as disease and famine. They say science should work to overcome human suffering. Rifkin agrees, but he believes the long-term costs of genetic engineering will outweigh its potential benefits.

You know, we rushed into the nuclear revolution without any questioning, and we rushed into the petrochemical revolution without any long-term look at the costs. And now our children’s generation is reaping a very terrible legacy in regard to everything from nuclear power plants that cannot be decommissioned to chemical waste dumps that cannot be cleaned up. We owe it to ourselves this time around to ask the hard questions at the beginning of the technology.

Swords into Plowshares

Guns or butter? For many nations, the choice is very real.

What makes a nation secure within its borders? Not just military hardware, according to Michael Renner.

Renner is an expert on international relations at the Worldwatch Institute, a private research organization in Washington, D.C. He contends that governments routinely risk their national security by defining it strictly in military terms. In the long run, Renner says, economic and environmental stability may be more important than military might to a nation’s well-being.

Ethiopia is an example. During the 1980s, famine devastated this eastern African country. Renner says the Ethiopian government was too preoccupied with a civil war to head off the disaster.

If Ethiopia had spent something like $50 million a year on halting its soil erosion and deforestation, it could have avoided the much larger costs that it incurred in the early and mid-1980s in the form of declining agricultural productivity and mass starvation.

Instead, says Renner, the Ethiopian government spent $50 million every two months to arm itself against anti-government rebels. Ironically, the rebels gained strength and determination as Ethiopia’s environment deteriorated. Renner says starving people lost faith in the government and looked to the rebels for help.

The Worldwatch expert says he does not mean to say the governments must choose simply between arms and the environment. He says they must deal with threats as they perceive them. But in their drive to arm themselves, some may neglect the land and water that ultimately sustain their people.
Thailand’s Sinking City

Overpopulation, pollution, flooding and food shortages are problems all over the world. But in many developing countries, these problems are aggravated by shortages of money and technical knowledge.

Bangkok, Thailand, for example, with an estimated 5.4 million people, subsists on an annual budget of only $170 million. By comparison, New York City has a budget 100 times larger.

Bangkok, a city handicapped by a mushrooming population and poor urban planning, suffers from severe flooding. During the rainy season, water runs more than three feet deep in some places and often stands in pools for months. But flooding is just a symptom of bigger problems. Thirty years ago, this coastal city made way for automobiles by filling in most of the canals that branched off a nearby river. This shut off a natural drainage system. Then, with the increasing population, there was a greater need for drinking water. The city dug 1,000 additional wells, but that severely depleted the water table that helped support the land upon which Bangkok is built. As water was taken out, the land subsided. Today the city is three feet lower than it was 30 years ago. Bangkok is now sinking as much as four inches a year, and experts warn that in 20 years, the city could sink below sea level and become uninhabitable.

This year, Thailand authorized $16.7 million to begin dredging a canal and building a dike and floodgates. But officials believe that the project will not be complete for several years. Given its ever-increasing population and a lack of money, Bangkok-Thailand’s capital city-faces a most precarious future. ■ June 1983

Pushing the Limits

Cairo, once the mystical city of a thousand minarets, has changed drastically under the crush of millions of people. Like many cities, the Egyptian capital struggles to provide its citizens with housing, food, clean water and other basic human needs. But people’s demands far outstrip Cairo’s ability to meet them.

Designed to hold a million and a half residents, the city today has more than nine million people and gains another 800 every day. Its Giza district is three times as densely populated as Manhattan, and in Giza, people are crowded into four- and five-story buildings, not skyscrapers. Many of Cairo’s poor build shacks on roofs of other buildings. Hundreds of thousands live in the city’s huge cemeteries, usually with no services at all.

In this overburdened city, human need overshadows questions of environmental protection. With sewage flooding the streets, no one asks if the Nile River is polluted. Yet in tackling Cairo’s social problems, Egypt is starting to salvage the city’s natural environment. The government is working to curb Cairo’s population growth, repair and extend its sewer and water systems, and improve its housing.

Egypt’s citizens are helping too. One television commentator spearheaded the creation of an Egyptian environmental agency. Some people have helped the environment by helping themselves. Forty thousand families make a living collecting, sorting and selling trash from Cairo’s upper-class households.

But the city’s environmental problems are far from solved, and the main obstacle is money. One important government agency, Egypt’s Ministry of Planning, has stated flatly that it cannot afford to worry about protecting the city’s environment when it faces so many other urgent problems. ■ December 1983
Supercity

Jose Lopez Portillo, the president of Mexico, has called it “the most absurd thing that ever happened.” Portillo was referring not to an event but to the capital of his own country: Mexico City.

First settled by the Aztec Indians more than 600 years ago, Mexico City has mushroomed this century into a metropolis of 14 million people—twice the size of New York City. And it is adding the equivalent of the population of Milwaukee—about 700,000—every year.

Urban experts say Mexico City may swell to more than 30 million people by the year 2000, making it by far the largest city in the world.

Hundreds of poor peasants and job hunters from small towns stream into the city each day. They hope to find work and prosperity for their families. Some do, but many more do not, and so Mexico City is a place of stunning contrasts. It has a grand boulevard lined with great buildings, glittering monuments and beautiful greenery. It has luxurious homes, fashionable shopping centers and elegant restaurants. But only a few miles distant, multitudes of families still live in rickety shacks and caves along dirt roads piled high with garbage. Many have no water or sewer systems. Some are literally starving to death. Even those who prosper must cope with huge traffic jams, severe air pollution and frequent breakdowns in city services.

Some urban planners blame Mexico City’s woes on the local government, which did nothing to control the city’s growth for decades. Now, they say, it is too late to solve the city’s problems; the best hope anyone can have is to make those problems more manageable. ■ July 1982

Grim Harvest

In a major nuclear war, an estimated one billion people in the northern hemisphere could be killed outright. But a recent study predicts far more would starve to death.

According to a report by the Scientific Committee on Problems of the Environment, far more people would die of starvation following a large-scale nuclear exchange than from bombs.

The committee, part of the Paris-based International Council of Scientific Unions, stressed the fragile nature of the world’s agriculture. The 200 biologists who contributed to the report agreed that a nuclear war would interrupt most agriculture in the northern hemisphere for almost a year and impair it for years thereafter.

Several factors account for this dire prediction. Proponents of the “nuclear winter” theory claim an unlimited nuclear war would produce persistent clouds of dust and smoke that could lower temperatures drastically. The biologists point out that even a small drop in temperature would reduce corn yields in the northern hemisphere. In fact, just a three-and-a-half-degree drop through the growing season would cut grain production 50 percent in Canada and the Soviet Union. And a one- or two-day cold spell could wipe out rice harvests. Cereal grains such as these make up 70 percent of the world’s food supply.

Computer models of the world’s climate also suggest that the aftermath of nuclear war would temporarily cut sunlight in the northern hemisphere by as much as 90 percent, which would seriously inhibit plant photosynthesis. Other environmental damage would include rain that’s more acidic and toxic compounds in the air from widespread fires.

A Toronto University scientist who helped prepare the committee’s report predicts its message will increase public pressure to reduce the world’s nuclear arsenal. ■ November 1985
Aftermath of War

As Vietnam attempts to recover from three decades of war, it is struggling to prevent an ecological catastrophe.

The war in Vietnam may be history, but its scars remain. Twenty-five million tons of bombs were dropped on Vietnam during the fighting. Countless villages and vast tracts of jungle were set ablaze. And much of South Vietnam was sprayed with massive doses of defoliants.

The human toll was tragic enough. But John MacKinnon, a consultant to the Swiss-based International Union for the Conservation of Nature and Natural Resources (IUCN), says the war also wiped out forests, poisoned land with toxic chemicals and harmed valuable fisheries.

All of that, says MacKinnon, compounds a problem Vietnam shares with so many other Third World countries: It has a large and growing population in a relatively small area, and the demand for food, fuel and other necessities is mounting. MacKinnon says the Vietnamese are clearing land for farming and firewood at a rate that will leave them without forests in 25 years. The land they're clearing has relatively poor soil and cannot sustain crops for more than a few years. And in their quest for meat, Vietnamese hunters have diminished the country's wildlife.

The leaders of Vietnam are aware of the problem they face. The government recently embarked on a national campaign to stabilize farm production and conserve soil, plant millions of new trees, create forest preserves and wildlife refuges, and slow the country's population growth.

Invited by the Vietnamese, the IUCN is helping with the campaign. MacKinnon says the situation in Vietnam is perilous but not hopeless. A combination of conservation and ecologically sound development, he says, could give the once war-torn country a brighter future.

Antarctic Disharmony?

For years, Antarctica has been an international laboratory where research takes precedence over politics. But now, the search for oil and precious minerals may disrupt this harmony.

Researchers from 16 nations have conducted experiments in Antarctica for the last quarter century with scientific rather than political imperatives in mind. The Antarctic Treaty of 1961, signed by a dozen nations, proclaimed Antarctica an international laboratory for scientific research.

Many scientists consider the isolated Antarctic continent an ideal natural laboratory. It has the Earth's cleanest air and water—good conditions for biological research. Antarctica has been spared political posturing by the many nations who lay some claim to it partly because the research was not geared toward exploitation of natural resources. But that may soon change. Many geologists believe that beneath the offshore continental shelf of Antarctica lie the Earth's last giant oil reserves. Others think the continent contains large deposits of gold and diamonds.

Many scientists fear once oil and mineral exploration begins in earnest, there will be no stopping the influx of governments and private corporations determined to get their piece of the Antarctic pie. But others claim that the weather and conditions are too hostile, that it would cost too much to drill for oil in temperatures that can drop to 100 degrees below zero and where winds often reach hurricane force.

Conflicts over jurisdiction will be considered when the Antarctic Treaty is reviewed in 1991. But some nations are already attempting to strengthen their position at the bargaining table. Chile and Argentina have even settled a few families on the Antarctic peninsula.

September 1985
The Unkindest Cut

Brazil is pushing hard to develop the natural resources of the Amazon River basin. Large areas of rain forest are disappearing as a result, and scientists say the forests could be gone in 35 years if uncontrolled cutting continues.

The Amazon basin contains more than half the world's tropical rain forests and the largest variety of plants and animals anywhere. The lush vegetation also helps moderate the world's climate.

But biologist Philip Fearnside of Brazil's National Institute for Amazon Research says the Brazilian government's promotion of mining, forestry and agriculture is causing the forests to be cut at an alarming rate. Fearnside says agricultural development is taking the biggest toll: Brazil is building roads into the tropical wilderness and providing financial incentives for new farm settlements.

Ironically, despite its dense tropical growth, much of the Amazon region is not good for long-term agriculture. Fearnside says farm crops use up all the soil's nutrients within a few years after the trees are cut. The land soon becomes barren and hard and can no longer support either crops or natural vegetation.

But Fearnside says the desire to push back the frontier is deeply rooted in Brazil. Political parties campaign on big promises of land development. Speculators buy land as a hedge against Brazil's 200 percent inflation rate. And the government seeks to raise cattle for export to help pay off its mounting international debts.

Fearnside and other scientists warn that Brazil's push to overcome its economic problems by developing the Amazon basin could have serious long-term environmental consequences. Rare and valuable plants and animals may be driven to extinction, and unwelcome climate changes could reach well beyond Brazil's borders.

Chemical Dependence

Developing countries that try to boost their agricultural production with chemicals may do themselves more harm than good.

Chemical fertilizers and pesticides have multiplied farm productivity several times over in countries like the United States. The so-called Green Revolution is the envy of many Third World countries fighting widespread hunger. Some of them are trying to join the Green Revolution by subsidizing the use of pesticides by their own farmers.

Economist Robert Repetto of the World Resources Institute, a private environmental research organization in Washington, D.C., has studied pesticide subsidies in nine developing countries where the government picks up an average of 44 percent of the farmers' costs of pesticide use.

Repetto says this government support may be a bad idea. He says many Third World farmers who can afford pesticides because of the subsidies don't know how to use them safely. As a result, health and environmental problems, such as farm-worker poisonings and groundwater contamination, are common. In addition, indiscriminate use of pesticides is creating populations of pests resistant to chemicals that are supposed to kill them.

Repetto says simply ending government subsidies for pesticide use in developing countries would solve many of the problems. The chemicals would once again be too expensive for most Third World farmers. Pakistan dropped its pesticide subsidies a few years ago, and Repetto says most of the related health and ecological problems have disappeared.

The World Resources Institute economist believes international relief organizations like the U.S. Agency for International Development could do more for the long-term agricultural health of Third World countries by promoting natural methods of pest control and helping those countries monitor and regulate their pesticide use.
**Be It Ever So Humble**

Housing conditions in many developing countries are abysmal. The United Nations estimates that up to 70 percent of the rural homes in the Third World provide inadequate shelter or lack basic necessities.

Many developing countries have policies geared toward improving housing. But Bruce Stokes, a former researcher with the Worldwatch Institute in Washington, D.C., believes some of the plans are ill-advised.

Some poor nations, trying to emulate more affluent countries, are building new dwellings out of cement. Unfortunately, says Stokes, cement homes require lots of material and sometimes have hidden costs that can raise the price of construction unexpectedly. This is a serious problem in countries where money is scarce and investments in industry and farming take precedence over those in housing.

Stokes says Third World countries would be better off adapting traditional building materials to modern needs. For example, he says adding small amounts of cement to mud and straw makes earthen bricks that are stronger and that insulate better. And mixing in a little asphalt makes the bricks water-resistant.

Stokes also recommends creating village woodlots with fast-growing trees. He says they would provide timber for roof beams and wall supports, which are needed even in homes built of mud. And they would increase stocks of firewood, which is in short supply in some countries.

Stokes believes innovative use of traditional materials should underlie all plans to improve housing in developing countries. It's less expensive than other options, he says. And since mud, thatch and wood are available almost everywhere, their use would lessen the need for imported materials and keep more of the money in developing countries at home, where it is desperately needed.

**A Grand Plan**

Third World countries are sometimes tempted to do things on a grand scale to catch up with wealthier nations. But if undertaken too hastily, their development schemes can go awry.

Witness the case of Sri Lanka. This small island nation off the coast of India imports 40 percent of its food and nearly all of the fuel it uses to generate power. But Sri Lanka is struggling to become more self-sufficient. The centerpiece of its struggle is a scheme to build four huge dams to draw hydroelectric power and irrigation water from the Mahaweli River. The government embarked on a crash program seven years ago to build the dams by 1986. Four western countries agreed to help finance the job.

Half a decade later, two of the dams are built and the other two are under construction. But their estimated cost has more than doubled in the past five years to $2.5 billion. The Sri Lankan people, already strapped for cash, are bearing the burden through cutbacks in public services.

Perhaps worse, the potential benefits of the Mahaweli project are threatened by erosion of bare hillsides along the river. Farmers have cut most of the trees there to grow tobacco and other crops. In its haste to build the dams, the government overlooked warnings that if new trees were not planted, erosion could clog the irrigation canals with silt. The government began a tree-planting program in 1981, but it's proceeding very slowly and draining the public till even more.

The Mahaweli project may yet deliver on its promise of economic hope for the people of Sri Lanka. But critics point out that a revitalization of hundreds of now-unused small hydro dams around the country might have been a less expensive, more environmentally sound option.

**September 1984**
The Price of Growth

Poland has become an industrial power since World War II. It also has become one of the world's most polluted countries.

Once a simple farming country, Poland is now the 11th most industrialized nation in the world. Steel, coal, chemicals and shipbuilding have surpassed agriculture in Poland's economy in the past 30 years, and the farming that remains depends more on chemicals and machinery than ever before.

Poland has paid for rapid modernization with widespread air and water pollution. As much as three quarters of the country's sewage flows into rivers untreated, and studies suggest that half of Poland's river water is unfit for consumption by animals. Streams once rich with salmon are now devoid of animal life.

Popular recreation spots along the Baltic Sea also have suffered. Poland's major rivers flow into the Baltic and carry sewage and industrial wastes that render the coastal waters unfit for swimming.

Air pollution has taken its toll, too. Poland derives 80 percent of its energy from coal, and that produces high levels of sulfur dioxide pollution thought to cause acid rain. Scientists believe severe air pollution is killing Polish forests and damaging historic buildings. They also fear the public health consequences of the dirty air.

Poland plans to continue its industrial buildup, but there are signs the country is waking up to its plight. Since 1980, environmental activism has spread across Poland, and the government seems willing to tolerate it. In fact, Poland's State Environmental Protection Council recently promised to make environmental concerns a priority in future economic plans. The government warned, though, that it will do only as much as it can afford. And in a country beset with a huge national debt, that may not be much. • January 1986

Another Japanese Success

What are Japanese farmers doing in the heart of Brazil? They're showing everyone else how to farm.

Japanese farmers who immigrated to Brazil in the 1920s have found a successful formula for agriculture in the tropics, where many farming ventures are marginal at best.

About 2,000 of the Japanese farmers live in the Amazon jungle. They grow some annual crops like rice, corn, and squash. But their success lies in perennial crops that yield high-value products like rubber, cacao and spices.

Christopher Uhl, an ecologist at Pennsylvania State University, says the Japanese make a good living off the infertile soil that characterizes much of the tropics. Their perennial crops are suited to the land and they also have fewer troubles with pests. And the Japanese farmers do not have to move every few years, unlike many of their neighbors who grow annual crops and, when their land is exhausted, need to clear more forest for new fields.

Uhl believes other tropical farmers could follow the Japanese example. He says that would be for their own good and for that of the forests, which are rapidly giving way to sprawling farms and cattle ranches.

It's rather revealing to see a Japanese farm, which might be at best 10 acres in size—that would be a very large operation-side-by-side with a 3,000-acre ranch, and the Japanese farmer is making much more money. It just illustrates how intensive farming of the right crop, in this case intensive farming of a high-value crop, can more wisely use land.

The Japanese success in Brazil is more than just luck. Uhl says the farmers are hard workers and good ecologists. • January 1987
**Dangers of Development**

In their rush to develop industry and agriculture, the nations of the Third World have also rushed into serious problems with occupational health.

Desperate even for meager wages, people in Asia and South America take jobs in factories and fields that expose them constantly to hazardous dust, chemicals, gases and noise. Most are unaware of the hazards until it is too late.

Textile workers in India, for example, suffer from a spate of occupational diseases. The Indian government estimates that one out of five has byssinosis, or brown-lung disease, a debilitating respiratory ailment that occurs in people who inhale cotton dust for several years. Textile workers also breathe gases from dyes and other chemicals that can cause heart disease, nervous disorders and even death.

Because the majority of workers in developing countries are still farmers, the most pervasive occupational hazard may be pesticides. Hard statistics are far from complete, but David Bull, author of a book on the problem, estimates that at least 375,000 people in the Third World suffer from pesticide poisoning each year, and 10,000 of those victims die. The tiny island nation of Sri Lanka alone has reported a thousand pesticide-related deaths in one year.

Illiteracy and a lack of information about workplace hazards make occupational health problems all the more ominous in developing countries. World health officials say that even where people are aware of health threats in factories and fields, they have difficulty finding out what to do about them. Stepped-up research and public information programs offer some hope, but with the rapid pace of economic growth in the Third World, keeping development healthy and safe is a monumental task.

**Tragedy of a Continent**

Most Americans cannot imagine what it's like to starve. But television has given us glimpses recently of the starving poor in Africa. And they remind us that not everyone is as well off as we are.

The famine in Africa should not come as a surprise. Lester Brown of the Worldwatch Institute warned three years ago that conditions in sub-Saharan Africa were ripe for disaster. Brown said soil erosion, the cutting of forests and excessive cropping had reached the point where the land could no longer support the swelling population. Crop yields were declining, and many of the affected countries were too poor to import the additional food they needed. The United Nations, the World Bank and other international organizations agreed that Africa was in serious trouble.

By mid-1983, severe drought had compounded the misery. Scattered press reports in the United States told of devastated crops and livestock. By last March, news trickled in that thousands of Africans were dying daily in 24 drought-stricken countries. An estimated 150 million people were in peril. That's equal to two-thirds of the population of the United States.

Publicity in the last few weeks has bolstered relief efforts. Thousands of tons of grain and other foods have been shipped to Africa, and more will follow. But the conditions that led to Africa's famine are complex and deeply rooted. Besides environmental problems, civil and international strife and government mismanagement have been blamed. Emergency food shipments may help in the short run. But a recent report prepared for the U.S. House of Representatives' Committee on Foreign Affairs says major improvements in the African food situation will take time, if they happen at all. And it seems certain that hundreds of thousands more—if not millions—will starve before the tragedy ends.

**January 1984**
**Ecological Refugees**

Large-scale environmental damage is creating a new class of desperate people: ecological refugees.

Millions of people have abandoned their homes in drought-stricken regions of Africa. They’ve fled the famine that ravaged Ethiopia, Chad and other countries and that still plagues nations such as Mozambique.

The World Bank blames natural climate change for the famine, but it says human activities intensified the problem. Tree-cutting, grazing cattle and poor farming practices helped render many areas uninhabitable.

Noel Brown of the United Nations Environment Programme says mass exoduses may become common if large-scale environmental problems continue. Brown cites Haiti, a poor Caribbean country, as an example. Haitian refugees risk their lives daily in makeshift boats to escape poverty and political turmoil.

The Haitian boat people are as much ecological refugees as they are political refugees. That is, you find a situation where the local environment has become so strained that the agricultural backbone is broken and people are looking for escape.

Brown says mass human migration may incite conflicts between nations.

The question of space for population, living space, becomes a major social problem and a political problem. And then states find that their borders are under very heavy pressure. Will this create security problems for national territories and across national boundaries? We are therefore concerned about how to define and redefine security within these terms.

The United Nations’ Brown says developed nations like the United States must help head off environmental catastrophes that create ecological refugees. ■ May 1987

**Where Hunger Strikes**

There’s good news and bad news in the battle against world hunger.

Harvests around the world are expected to be bigger this year than last. The U.S. Department of Agriculture says thanks largely to rains that brought some relief to dozens of drought- and famine-stricken countries in Africa, more food should be available to the world’s hungry. That’s the good news.

The bad news is that developing countries still will need nine million more tons of food this year than they normally grow and import just to maintain their current levels of consumption. According to the USDA, it would take twice as much additional food to meet the minimum nutritional needs of everyone in those countries. And they are not likely to get it.

Meeting the rising long-term demand for food around the world is a complex problem. Most analysts agree that there is no overall shortage of food in the world but that its distribution is very uneven. While countries like the United States have large surpluses, others don’t have nearly enough.

Overall, world food production has more than doubled since 1950, and some developing regions have come a long way toward self-sufficiency. Southeast Asia, for instance, has tripled its output. But other areas have not been as fortunate. Most of Africa has managed only modest gains in food production, and those have been outstripped by the continent’s rapidly growing population. Today Africa produces less food per person than it once did, and more people go hungry.

There are no easy answers to the problem. Advances in agriculture offer hope for more growth in food production. But analysts say poverty, civil strife, corruption, population growth and weather are all part of the problem, too. And any of those things can stand in the way of a better life for the world’s hungry. ■ April 1986