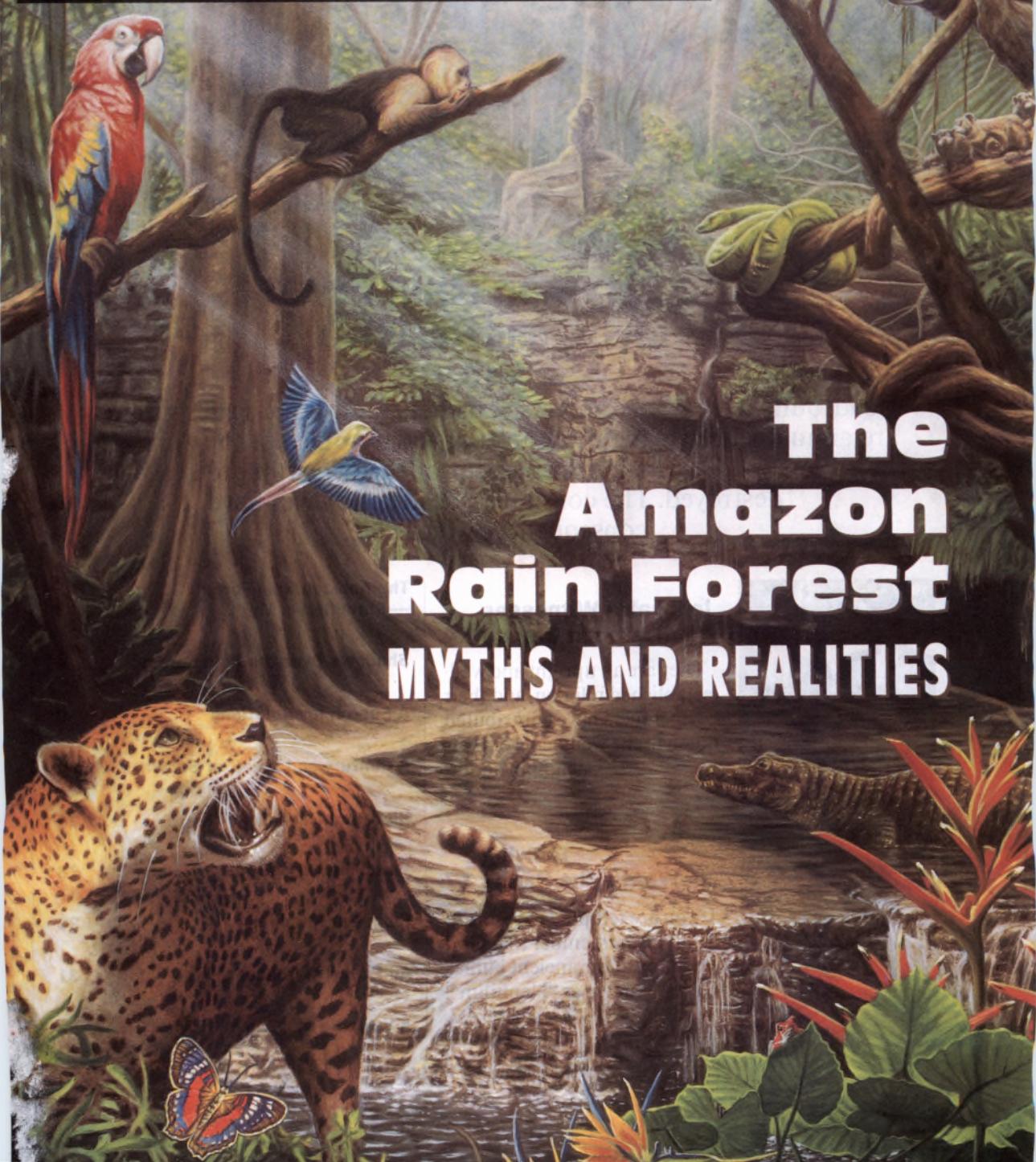


Awake!

March 22, 1997

The Amazon Rain Forest MYTHS AND REALITIES





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The Amazon Rain Forest Myths and Realities

3-13

Road builders, loggers, miners, ranchers, and large-scale farmers are annually destroying thousands of square miles of the Amazon rain forest. An estimated 10 percent of the forest may already be destroyed. The continuing destruction will have consequences worldwide.



Jehovah's Witnesses Vindicated in Greece 14

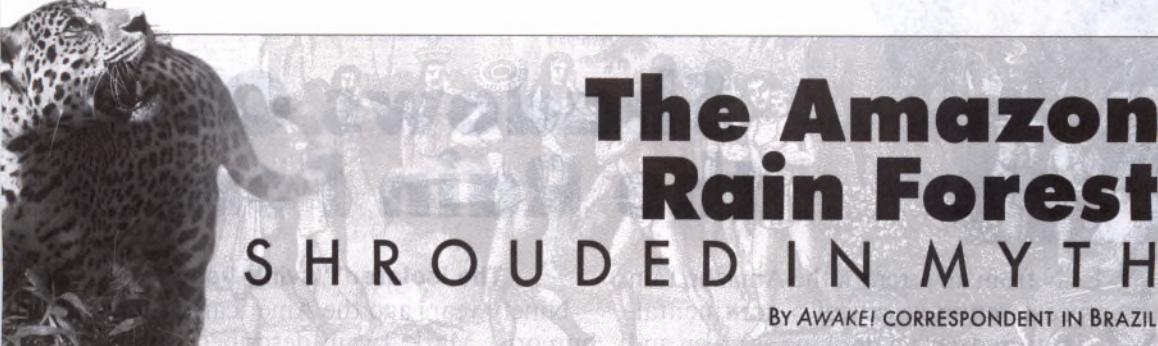
They are an upright and well-established religion, and their members have contributed much to the well-being of their neighborhoods.



Bullying —What's the Harm? 17

If you are tempted to resort to bullying, remember that God destroyed the ancient bullies known as "Nephilim"! —Genesis 6:4-7.

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The Amazon Rain Forest SHROUDED IN MYTH

BY AWAKE! CORRESPONDENT IN BRAZIL

THE Irimarai Indians living along Peru's Napo River could not believe their eyes! Two square-rigged ships, nothing like their own slender canoes, came sailing toward their village. They spotted bearded warriors aboard—different from any other tribe they had ever seen. Bewildered, the Indians scrambled for cover and looked on as the white-skinned aliens jumped ashore, devoured the village food supply, and then sailed off again—fired by the thought of making history as the first expedition to plod across the entire rain forest, from the Andes Mountains to the Atlantic Ocean.

During that year, 1542, one Indian tribe after another suffered similar shocks as those European explorers, flashing crossbows and harquebuses, pushed ever deeper into South America's tropical forest.

Francisco de Orellana, the Spanish captain in charge of the conquistadores, soon discovered that word of his troops' looting and shooting had traveled faster than their two brigantines. Indian tribes farther downstream (near today's Brazilian city of Manaus) with their arrows at the ready were awaiting the 50-odd invaders.

And good shots those Indians were, admitted crew member Gaspar de Carvajal. He spoke from experience, for one of the Indians' arrows had landed between his ribs. "Had it not been for the thickness of my habit," scribbled the wounded friar, "that would have been the end of me."

Top background: *The Complete Encyclopedia of Illustration/J. G. Heck*

'Women Fighting as Ten Men'

Carvajal went on to describe the driving force behind those bold Indians. 'We saw women fighting in front of the men as women captains. These women are white and tall, with their long hair braided and wound about their heads. They are robust and, with their bows and arrows in their hands, are doing as much fighting as ten men.'

Whether the explorers' sighting of women warriors was real or, as one source puts it, "merely a mirage born of jungle fever" is unknown. But according to at least some accounts, by the time Orellana and Carvajal reached the mouth of the massive river and sailed into the Atlantic Ocean, they believed they had glimpsed the New World's version of the Amazons, the fierce female warriors described in Greek mythology.*

Friar Carvajal preserved the tale of the American Amazons for posterity by including it in his eyewitness account of Orellana's eight-month-long expedition. Captain Orellana, for his part, sailed to Spain, where he gave a vivid account of his journey along what he romantically called the *Río de las Amazonas*, or Amazon River. Before long, 16th-century cartographers were scratching a fresh name across the budding map of South America—the Amazon. So the Amazon forest became shrouded in myth, but now that forest is plagued with realities.

* The word "Amazons" likely comes from the Greek word *a-*, meaning "without," and *ma-zos'*, meaning "breast." According to legend, the Amazons removed the right breast to handle the bow and arrow more easily.



Shadows Over the Rain Forest

SEEN from an aircraft, the Amazon rain forest reminds you of a continental-size tufted carpet, looking as green and pristine now as it did when Orellana put it on the map. As you slog through the hot, humid forest on the ground, dodging insects the size of small mammals, you find it hard to tell where reality ends and fantasy takes over. What appear to be leaves turn into butterflies, lianas into snakes, and chunks of dry wood into startled rodents that scurry away at top speed. In the Amazon forest, fact is still blurred with fiction.

"The greatest irony," notes one observer, "is that Amazon reality is as fantastic as its myths." And fantastic it is! Picture a forest as large as Western Europe. Stuff it with over 4,000 different species of trees. Embellish it with the beauty of more than 60,000 species of flowering plants. Color it with the brilliant hues of 1,000 species of birds. Enrich it with 300 species of mammals. Saturate it with the buzz of perhaps two million species of insects. Now you see why anyone describing the Amazon rain forest ends up using superlatives. No lesser comparisons do justice to the teeming biological bounty of this largest tropical rain forest on earth.

Awake!

Why Awake! Is Published *Awake!* is for the enlightenment of the entire family. It shows how to cope with today's problems. It reports the news, tells about people in many lands, examines religion and science. But it does more. It probes beneath the surface and points to the real meaning behind current events, yet it always stays politically neutral and does not exalt one race above another. Most important, this magazine builds confidence in the Creator's promise of a peaceful and secure new world that is about to replace the present wicked, lawless system of things.

Would you welcome more information? Write Watch Tower at the appropriate address on page 5. Publication of *Awake!* is part of a worldwide Bible educational work supported by voluntary donations.

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The Isolated "Living Dead"

Ninety years ago the American writer and humorist Mark Twain described this fascinating forest as "an enchanted land, a land wastefully rich in tropical wonders, a romantic land where all the birds and flowers and animals were of the museum varieties, and where the alligator and the crocodile and the monkey seemed as much at home as if they were in the Zoo." Today, Twain's witty remarks have acquired a sober twist. Museums and zoos may soon be the *only* homes left for a growing number of the Amazon's tropical wonders. Why?

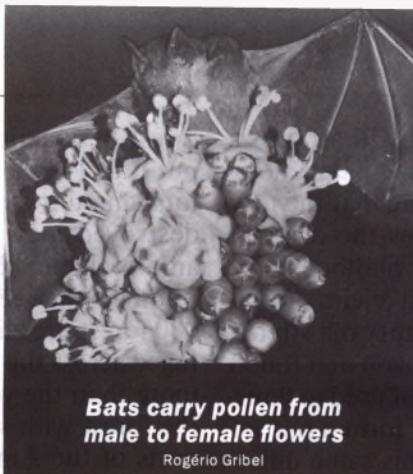
The leading cause is obviously man's hacking away at the Amazon rain forest, rooting out the natural home of the region's flora and fauna. However, besides wholesale habitat destruction, there are other—more subtle—causes that are turning plant and animal species, even though still alive, into "living dead." In other words, authorities believe that there is nothing that can stop the species from dying out.

One such cause is isolation. Government officials with a fancy for conservation may ban the chain saw from a patch of forest to secure the survival of species living there.

However, a small forest island offers these species the prospect of eventual death. *Protecting the Tropical Forests—A High-Priority International Task* gives an example to illustrate why small forest islands fail to support life for very long.

Tropical-tree species often consist of male and female trees. To reproduce, they get help from bats that carry pollen from male to female flowers. Of course, this pollination service works only if the trees grow within the bat's flying radius. If the distance between a female tree and a male tree becomes too great—as often happens when a forest island ends up surrounded by a sea of scorched earth—the bat cannot bridge the gap. The trees, notes the report, then turn into “living dead” since their long-term reproduction is no longer possible.”

This link between trees and bats is only one of the relationships making up the Amazonian natural community. Simply put, the Amazon forest is like a huge house that provides room and board to an assortment of different but tightly interrelated individuals. To avoid overcrowding, the inhabitants of the rain forest live on different stories, some close to the forest floor, others away up in the canopy. All residents have a job, and they work around the clock—some in



the day, others during the night. If all species are allowed to do their share of the work, this complex community of Amazonian flora and fauna functions with clockwork precision.

The Amazon's ecosystem (“eco” comes from *oikos*, the Greek word for “house”) is, however,

fragile. Even if man's interference in this forest community is limited to exploiting a few species, his disruption reverberates throughout all the stories of the forest house. Conservationist Norman Myers estimates that the extinction of a single plant species can eventually contribute to the death of as many as 30 animal species. And since most tropical trees, in turn, depend on animals for seed dispersal, man's wiping out animal species leads to the extinction of the trees they service. (See the box “The Tree-Fish Connection.”) Like isolation, disrupting relationships assigns more and more forest species to the ranks of the “living dead.”

Small Cuts, Small Losses?

Some justify deforestation of small areas by reasoning that the forest will bounce back and grow a fresh layer of greenery over a stretch of clear-cut land in much the same way our body grows a fresh layer of skin over a cut in a finger. Right? Well, not quite.

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It is true, of course, that the forest grows back if man leaves a deforested patch alone long enough. But it is also true that the new layer of vegetation resembles the original forest no more than a poor photocopy resembles a crisp printout. Ima Vieira, a Brazilian botanist, studied a century-old stretch of regrown forest in the Amazon and found that of the 268 tree species that used to flourish in the old forest, only 65 form a part of the regrown forest today. This same difference, says the botanist, holds true for the region's animal species. So although deforestation is not, as some claim, turning green forests into red deserts, it is turning parts of the Amazon rain forest into a weak imitation of the original.

In addition, cutting even a small stretch of forest often destroys many plants and animals that grow, crawl, and clamber in only that spread of forest and nowhere else. Researchers in Ecuador, for instance, found 1,025 plant species in a certain area of seven tenths of a square mile of tropical forest. More than 250 of those species grew nowhere else on earth. "A local example," says Brazilian ecologist Rogério Gribel, "is the *sauim-de-coleira* (pied bare-faced tamarin, in English)," a small, charming monkey that looks as if it were wearing a white T-shirt. "The few remaining ones live only in a small forest stretch near Manaus in central Amazon, but the destruction of that small habitat," says Dr. Gribel, "will wipe out this species forever." Small cuts but big losses.

Rolling Back the "Rug"

Outright deforestation, however, is throwing the most alarming shadow over the Amazon rain forest. Road builders, loggers, miners, and hordes of others are rolling back the forest like a floor rug, razing entire ecosystems in the blink of an eye.

While there is deep disagreement about the exact figures for Brazil's annual rate of

forest destruction—conservative estimates put it at 14,000 square miles per year—the total amount of Amazon rain forest already destroyed may be more than 10 percent, an area larger than Germany. *Veja*, Brazil's leading newsweekly, reported that some 40,000 forest fires lit by slash-and-burn farmers raged across the country in 1995—five times more than the year before. Man is torching the forest with such vigor, alerted *Veja*, that parts of the Amazon resemble an "inferno on the green frontier."

Species Are Going—So What?

'But,' some ask, 'do we need all those millions of species?' Yes, we do, argues conservationist Edward O. Wilson, of Harvard University. "Since we depend on functioning ecosystems to cleanse our water, enrich our soil and create the very air we breathe," says Wilson, "biodiversity is clearly not something to discard carelessly." Says the book *People, Plants, and Patents*: "Access to abundant genetic diversity will be the key to human survival. If diversity goes, we will soon follow."

Indeed, the impact of species destruction goes far beyond felled trees, threatened animals, and harassed natives. (See the box "The Human Factor.") The downsizing of forests may affect you. Think of this: A farmer in Mozambique cutting cassava sticks, a mother in Uzbekistan taking a birth-control pill, a wounded boy in Sarajevo being given morphine, or a customer in a New York store savoring an exotic fragrance—all these people, notes the Panos Institute, use products that sprang from the tropical forest. The standing forest thus serves people around the world—including you.

No Feast, No Famine

Granted, the Amazon rain forest cannot provide a worldwide feast, but it can help to prevent a worldwide famine. (See the box "The Fertility Myth.") In what way? Well,

The Human Factor

Disruption and deforestation are harming not only plants and animals but humans as well. Some 300,000 Indians, a remnant of the 5,000,000 Indians that once inhabited Brazil's Amazon region, still coexist with their forest environment. The Indians are increasingly disturbed by loggers, gold seekers, and others, many of whom consider the Indians "obstacles to development."

Then there are the caboclos, tough people of mixed white and Indian ancestry whose forefathers settled in Amazonia some 100 years ago. Dwelling in stilted sheds along the rivers, they may never have heard of the word "ecology," but they live off the forest without destroying it. Yet, their day-to-day existence is affected by the waves of new immigrants now entering their forest home.

In fact, throughout the Amazon rain forest, the future of some 2,000,000 nut gatherers, rubber tappers, fishermen, and other natives, living harmoniously with the cycles of the forest and the rhythms of the rivers, is uncertain. Many believe that efforts to preserve the forest should go beyond protecting mahogany trees and manatees. They should protect the human forest dwellers as well.

in the 1970's, on a large scale, man began to sow a few plant varieties that produced bumper crops. Though these superplants have helped to feed an additional 500 million people, there is a catch. Since they lack genetic variation, they are weak and vulnerable to disease. A virus can decimate a nation's supercrop, triggering famine.

So to produce more resilient crops and avert starvation, the UN Food and Agriculture Organization (FAO) now urges the "use of a broader range of genetic material." And that is where

the rain forest and its original inhabitants come in.

Since tropical forests house more than half the world's plant species (including some 1,650 species that have potential as food crops), the Amazon nursery is the ideal spot for any researcher looking for wild plant species. In addition, the forest's inhabitants know how to utilize these plants.

Philip M. Fearnside

Your nursery and pharmacy



The Fertility Myth

The idea that Amazon soil is fertile, notes the magazine *Counterpart*, is a "myth that is hard to dispel." In the 19th century, explorer Alexander von Humboldt described the Amazon as the "granary of the world." A century later, U.S. President Theodore Roosevelt likewise felt that the Amazon promised good farming. "Such a rich and fertile land," he wrote, "cannot be permitted to remain idle."

Indeed, the farmer who believes as they did finds that for a year or two, the land gives a decent crop because the ashes of burned trees and plants serve as fertilizer. After that, however, the soil turns barren. Although the forest's lush greenery promises rich soil beneath, the soil is, in reality, the forest's weak side. Why?

Awake! talked with Dr. Flávio J. Luizão, a researcher at the National Institute for Research in the Amazon and an expert on rain-forest soil. Here are some of his comments:

'Unlike many other forest soils, most soil in the Amazon basin doesn't get nutrients from the bottom up, from decomposing rock, because the parent rock is nutrient poor and lies too deep below the surface. Instead, the leached soil gets nutrients from the top down, from rain and litter. However, both raindrops and fallen leaves need help in turning nutritious. Why?

'Rainwater falling on the rain forest doesn't have many nutrients itself. However, when it hits the leaves and runs along the trunks of the trees, it picks up nutrients from leaves, branches, moss, algae, ants' nests, dust. By the time the water seeps into the soil, it has turned into good plant food. To keep this liquid food from simply flowing into the creeks, the soil uses a nutrient trap formed by a mat of fine roots spread throughout the first few inches of the top-soil. A proof of the trap's effectiveness is that the creeks receiving this rainwater have even poorer nutrient content than the forest soil itself. So the nutrients get into the

roots before the water gets into the creeks or rivers.

'Another source of food is litter—fallen leaves, twigs, and fruits. Some eight tons of fine litter ends up on one hectare [two and a half acres] of forest floor each year. But how does the litter get under the surface of the soil and into the plants' root systems? Termites help out. They cut disk-shaped pieces out of the leaves and carry these pieces into their subterranean nests. Especially during the wet season, they are an active bunch, moving an amazing 40 percent of all forest-floor litter underground. There, they use the leaves to build gardens for growing fungus. This fungus, in turn, decomposes the plant material and releases nitrogen, phosphorus, calcium, and other elements—valuable nutrients for plants.

'What do the termites get out of it? Food. They eat the fungi and may swallow some bits of leaves as well. Next, the microorganisms in the termites' intestines get busy transforming the termites' food chemically, so that, as a result, the insects' excretion becomes nutrient-rich plant food. So rainfall and the recycling of organic matter are two of the factors that keep the rain forest standing and growing.

'It's easy to see what happens if you clear-cut and burn the forest. There is no longer a canopy to intercept rainfall or a layer of litter to be recycled. Instead, torrential rains hit the bare soil directly with great force, and their impact hardens the surface. At the same time, sunlight falling straight on the soil increases the surface temperature and compacts the soil. The result is that rainwater now runs off the land, feeding not the soil but the rivers. Nutrient loss from deforested and burned land may be so great that the streams near deforested areas even suffer from an excess of nutrients, endangering the lives of aquatic species. Clearly, if left alone, the forest sustains itself, but man's interference spells disaster.'

Brazil's Cayapo Indians, for instance, not only breed new crop varieties but also preserve samples in hillside gene banks. Cross-breeding such wild crop varieties with the vulnerable domesticated crop varieties will bolster the strength and resilience of man's food crops. And that boost is urgently needed, says FAO, for "a 60% increase in food output is necessary in the next 25 years." In spite of this, forest-crushing bulldozers keep pushing deeper into the Amazon rain forest.

The consequences? Well, man's destroying the rain forest is much like a farmer's eating his seed corn—he satisfies his immediate hunger but endangers future food supplies. A group of experts on biodiversity recently warned that "the conservation and development of the remaining crop diversity is a matter of vital global concern."

Promising Plants

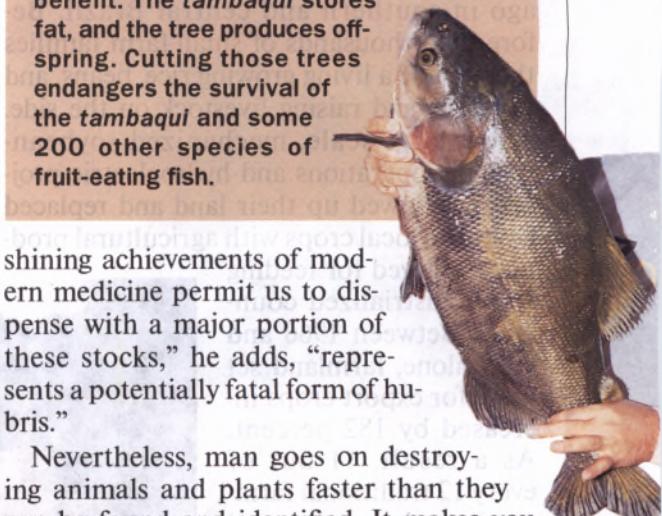
Now step into the forest "pharmacy," and you will see that man's fate is intertwined with tropical vines and other plants. For instance, alkaloids extracted from Amazonian vines are used as muscle relaxants prior to surgery; 4 out of 5 children with leukemia are helped to live longer thanks to the chemicals found in the rosy periwinkle, a forest flower. The forest also provides quinine, used to fight malaria; digitalis, used to treat heart failure; and diosgenin, used in birth-control pills. Other plants have shown promise in fighting AIDS and cancer. "In the Amazon alone," says a UN report, "2,000 species of plants used as medicines by the native population and that have pharmaceutical potential have been recorded." Worldwide, says another study, 8 out of every 10 persons turn to medicinal plants to treat their ills.

So it makes sense to save the plants that save us, says Dr. Philip M. Fearnside. "Loss of Amazonian forest is considered a serious potential setback to efforts to find cures for human cancer. . . . The notion that the



The Tree-Fish Connection

During the rainy season, the Amazon River rises and engulfs the trees growing in lowland forests. At the peak of the flooding, most trees in these forests bear fruit and drop their seeds—but there are, of course, no submerged rodents around to disperse them. Enters the tambaqui fish (*Colponomea macropomum*), a floating nutcracker with a keen sense of smell. Swimming among the branches of submerged trees, it smells out the trees that are about to drop seeds. When the seeds fall into the water, the fish crushes the shells with his powerful jaws, swallows the seeds, digests the fleshy fruit around them, and drops the seeds on the forest floor to germinate when the floodwaters recede. Fish and tree benefit. The tambaqui stores fat, and the tree produces offspring. Cutting those trees endangers the survival of the tambaqui and some 200 other species of fruit-eating fish.



shining achievements of modern medicine permit us to dispense with a major portion of these stocks," he adds, "represents a potentially fatal form of hubris."

Nevertheless, man goes on destroying animals and plants faster than they can be found and identified. It makes you wonder: 'Why is the deforestation continuing? Can the trend be reversed? Does the Amazon rain forest have a future?' *awake.com*



A Search for Solutions

“N arguing of the shadow,” wrote English author John Llyl, “we forgo the substance.” To avoid that pitfall, we should indeed keep in mind that today’s shadows over the rain forest are mere reflections of deeper problems and that forest destruction will continue unless its underlying causes are tackled. What are those causes? The “fundamental forces attacking Amazonian preservation,” says a UN-sponsored study, are “poverty and human inequities.”

The Not-So-Green Revolution

Forest destruction, argue some researchers, is partially a side effect of the so-called green revolution that took off some decades ago in southern and central Brazil. Before that, thousands of small-farm families there made a living growing rice, beans, and potatoes and raising livestock on the side. Then, large-scale, mechanized soybean-growing operations and hydroelectric projects swallowed up their land and replaced cows and local crops with agricultural products reserved for feeding the industrialized countries. Between 1966 and 1979 alone, farmland set aside for export crops increased by 182 percent. As a result, 11 out of every 12 traditional farmers lost their land and livelihood. For them, the green revolution turned into a bleak revolution.

Where could these landless farmers go? Politicians, unwilling to face unjust land distribution in their own region, showed them the way out by promoting the Amazon region as “a land without men for men without land.” Within a decade after the opening of the first Amazon highway, more than two million poor farmers from southern Brazil and drought- and poverty-stricken northeastern Brazil had settled in thousands of shacks alongside the highway. When more roads were built, more would-be farmers traveled to the Amazon, ready to turn forest into farmland. As they look back on these colonization programs, researchers say that “the balance sheet on almost 50 years of colonization is negative.” Poverty and injustice have been “exported to the Amazon,” and “new problems have been created in the Amazon region” as well.

Three Steps Forward

To help tackle the causes of deforestation and improve man’s living conditions in the Amazon rain forest, the

Commission on Development and Environment for Amazonia published a document recommending that, among other things, the governments in the Amazon basin take three initial steps. (1) Address the economic and social problems in the poverty-stricken regions outside the Amazon rain



Logging road carved out of the forest

forest. (2) Use the standing forest and reuse the areas that have already been deforested. (3) Deal with society's grave injustices—the real causes of human misery and forest destruction. Let us look closer at this three-step approach.

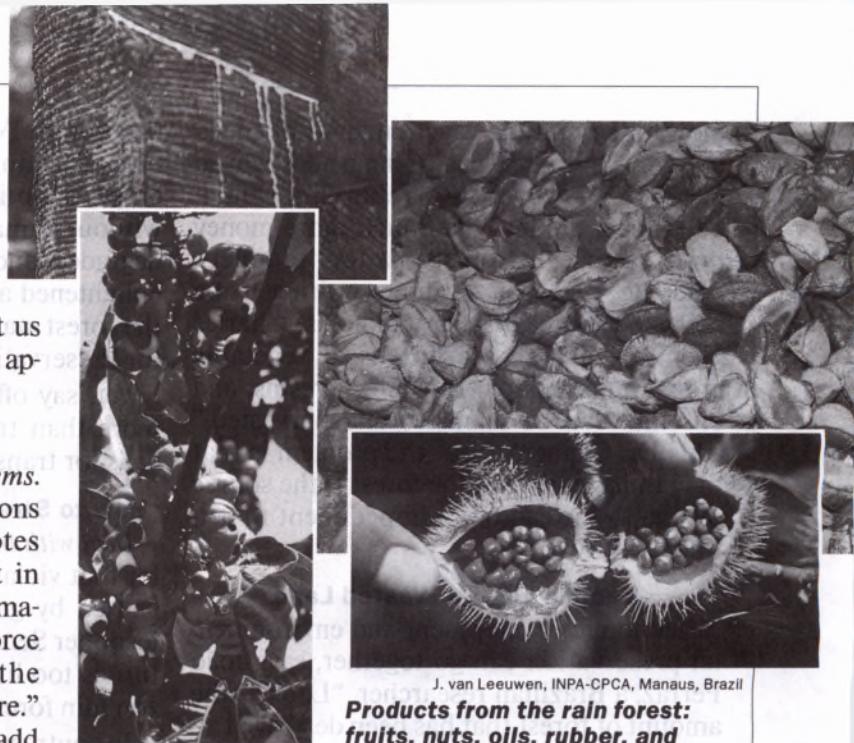
Making Investments

Address socio-economic problems. "One of the more efficient options to reduce deforestation," notes the commission, "is to invest in some of the poorest areas in Amazonian countries, those that force populations to migrate to the Amazon to seek a better future." However, the commissioners add that "this option is rarely considered in national or regional development planning or by those in the industrialized countries who champion sharp reductions in Amazon deforestation rates." Yet, explain the authorities, if government officials and concerned foreign governments aim their expertise and financial support at solving problems such as insufficient land distribution or urban poverty in the Amazon's surrounding regions, they will slow the flow of Amazon-bound farmers and help save the forest.

What, though, can be done for small farmers already living in the Amazon? Their day-to-day survival depends upon growing crops on soil unfit for farming.

The Forest for the Trees

Use and reuse the forest. "Tropical forests are over-exploited but under-used. On this paradox depends their salvation," says *The Disappearing Forests*, a UN publication. Instead of exploiting the forest by felling it, say the experts, man should use the forest by ex-



J. van Leeuwen, INPA-CPCA, Manaus, Brazil

Products from the rain forest: fruits, nuts, oils, rubber, and much more

tracting, or harvesting, its produce, such as fruits, nuts, oils, rubber, essences, medicinal plants, and other natural products. Such products, it is claimed, represent "an estimated 90 percent of the economic value of the forest."

Doug Daly, of the New York Botanical Garden, explains why he believes shifting from forest destruction to forest extraction makes sense: "It placates the government—they don't see big chunks of Amazonia being taken out of the marketplace. . . . It can provide a life that will keep people living and working, and it conserves the forest. It's pretty hard to find something negative to say about it."—*Wildlife Conservation*.

Leaving the forest for the sake of the trees actually improves the living conditions of the forest's inhabitants. Researchers in Belém, northern Brazil, have calculated, for instance, that transforming two and a half acres into pastureland gives a profit of only \$25 per year. So just to earn Brazil's

monthly minimum wage, a man would need to have 120 acres of pastureland and 16 head of cattle. However, *Veja* reports, a would-be rancher could make much more money by extracting the forest's natural products. And the scope of products waiting to be collected is amazing, says biologist Charles Clement. "There are dozens of vegetable crops, hundreds of fruit crops, resins, and oils that can be managed and harvested," adds Dr. Clement. "But the problem is that man must learn that the forest is the source of wealth instead of an impediment to getting wealthy."

Second Life for Wasted Land

Economic development and environmental preservation can go together, says João Ferraz, a Brazilian researcher. "Look at the amount of forest that has been destroyed already. There is no need to cut more primary forest. Instead, we can reclaim and reuse the already deforested and degraded areas." And in the Amazon region, there is plenty of degraded land to go around.

Beginning in the late 1960's, the government granted huge subsidies to encourage big investors to transform the forest into pastures. They did that, but as Dr. Ferraz explains, "the pastures were degraded after six years. Later, when everyone realized that it was a huge mistake, the big landowners said: 'OK, we've received enough money from the government,' and they left." The result? "Some 80,000 square miles of abandoned pastureland is withering away."

Today, however, researchers like Ferraz are finding new uses for these degraded lands. In what way? Some years ago they planted 320,000 seedlings of the Amazonia-nut tree on an abandoned cattle farm. Today, those seedlings are fruit-bearing trees. Since the trees grow fast and also provide valuable wood, Amazonia-nut seedlings are now planted on deforested land in various

parts of the Amazon basin. Extracting products, teaching farmers to plant perennial crops, adopting methods to harvest wood without damaging the forests, and reviving degraded land are, in the view of the experts, enlightened alternatives that can help keep the forest standing.—See the box "Working for Preservation."

Yet, say officials, saving forests requires more than transforming degraded land. It calls for transforming human nature.

How to Straighten Out What Is Crooked

Deal with injustices. Unfair human behavior that violates the rights of others is often caused by greed. And, as the ancient philosopher Seneca observed, "for greed all nature is too little"—including the vast Amazon rain forest.

In contrast with the Amazon's poor struggling farmers, industrialists and owners of large tracts of land are stripping the forest to fatten their pocketbooks. Authorities point out that Western nations are likewise to blame for lending a big hand to the chain saws at work in the Amazon. "The wealthy industrialized countries," concluded one group of German researchers, have "largely caused the already existing environmental damage." The Commission on Development and Environment for Amazonia states that preserving the Amazon calls for nothing less than "a new global ethic, an ethic that will produce an improved style of development, based on human solidarity and justice."

However, continuing smoke clouds over the Amazon remind one that despite the efforts of environment-conscious men and women worldwide, transforming enlightened ideas into reality is proving to be as hard as grabbing smoke. Why?

The roots of vices such as greed run deep in the fabric of human society, far deeper

than the roots of Amazon trees run into the forest soil. Though we should personally do what we can to contribute to forest preservation, it is not realistic to expect that humans, however sincere, will succeed in uprooting the deep and entangled causes of forest destruction. What ancient King Solomon, a wise observer of human nature, noted some three thousand years ago still holds true. By human efforts alone, "that which is made crooked cannot be made straight." (Ecclesiastes 1:15) Similar to that is the Portuguese saying, "*O pau que nasce torto, morre torto*" (The tree born crooked, dies crooked). Nevertheless, rain forests around the world have a future. Why?

Enlightenment Ahead

Some one hundred years ago, Brazilian author Euclides da Cunha was so impressed by the Amazon's wild profusion of life-forms that he described the forest as "an unpublished and contemporary page of Genesis." And although man has been busy soiling and ripping that "page," the standing Amazon still is, as the report *Amazonia Without Myths* says, "a nostalgic symbol of the earth as it was at the time of Creation." But for how much longer?

Consider this: The Amazon rain forest and the world's other rain forests breathe evidence of, as Da Cunha put it, "a singular intelligence." From their roots to their

leaves, the trees of the forest declare that they are the handiwork of a master architect. That being the case, will this Great Architect then allow greedy man to wipe out the rain forests and ruin the earth? A Bible prophecy answers this question with a resounding no! It reads: "The nations became wrathful, and your [God's] own wrath came, and the appointed time . . . to bring to ruin those ruining the earth."—Revelation 11:18.

Note, however, that this prophecy tells us that the Creator not only will get to the root of the problem by eliminating greedy people but will do so in our time. Why can we make this statement? Well, the prophecy says that God goes into action at a time when man is "ruining" the earth. When those words were written nearly two thousand years ago, man lacked both the numbers and the means to do that. But the situation has changed. "For the first time in its history," notes the book *Protecting the Tropical Forests—A High-Priority International Task*, "humanity is today in a position to destroy the bases of its own survival not just in individual regions or sectors, but on a global scale."

"The appointed time" when the Creator will act against "those ruining the earth" is near. The Amazon rain forest and other endangered environments on earth have a future. The Creator will see to it—and that is, not a myth, but a reality.

Working for Preservation

An area of nearly 4,300,000 square feet of lush secondary forest in the central Amazonian city of Manaus shelters the various offices of Brazil's National Institute for Research in the Amazon, or INPA. This 42-year-old institution, with 13 different departments covering everything from ecology to forestry to human health, is the region's largest research organization. It also houses one of the world's richest collections of Amazonian plants, fish, reptiles, am-

phibians, mammals, birds, and insects. The work of the institute's 280 researchers is contributing to man's better understanding the complex interactions of the Amazonian ecosystems. Visitors to the institute come away with a feeling of optimism. Despite bureaucratic and political restrictions, Brazilian and foreign scientists have rolled up their sleeves to work for the preservation of the crown jewel of the world's rain forests—the Amazon.

JEHOVAH'S WITNESSES VINDICATED IN GREECE

BY AWAKE! CORRESPONDENT

THE Orthodox priest in the Cretan village of Gazi stated during one of his sermons: "Jehovah's Witnesses have a hall right here in our village. I need your support to get rid of them." One evening a few days later, the Kingdom Hall windows were smashed and shots were fired at it by unknown individuals. Thus the issue of religious freedom was again raised in Greece.

These events motivated four of the local Witnesses, Kyriakos Baxevanis, Vassilis Hatzakis, Kostas Makridakis, and Titos Manoussakis, to lodge a petition with the Minister of Education and Religious Affairs for a permit to hold religious meetings. They hoped that getting a permit would eventually secure police protection. However, it was not going to be that easy.

The priest sent a letter to the headquarters of the security police in Heraklion, drawing the authorities' attention to the Kingdom Hall of Jehovah's Witnesses in his parish and requesting that sanctions be imposed and that their meetings be banned. This resulted in a police investigation and interrogations. Eventually, the prosecutor instituted criminal proceedings against the Witnesses, and the case was brought before the court.

On October 6, 1987, the Criminal Court of Heraklion acquitted the four defendants, stating that "they had not committed the act of which they were charged, because members of a religion are free to conduct meetings . . . , no permit being necessary." Nevertheless, the prosecutor appealed the decision two days later, and the case was brought before a higher court. On February 15, 1990,

this court sentenced the Witnesses to two months' imprisonment and a fine of about \$100. Subsequently, the defendants appealed to the Greek Supreme Court.

On March 19, 1991, the Supreme Court dismissed the appeal and upheld the conviction. Over two years later, on September 20, 1993, when the Supreme Court decision was announced, the Kingdom Hall was sealed by the police. As revealed by a police document, the Orthodox Church of Crete was behind this action.

This situation came about because certain laws, passed in 1938 with the intention of restricting religious freedom, are still in force in Greece. They stipulate that if an individual wishes to operate a place of worship, a permit must be obtained from the Ministry of Education and Religious Affairs and also from the local bishop of the Orthodox Church. For several decades, these anachronistic laws have caused many difficulties for Jehovah's Witnesses.

Freedom of Religion, and Human Rights

On learning that their conviction had been upheld by the Supreme Court, the four Witnesses submitted an application to the European Commission of Human Rights, in Strasbourg, France, on August 7, 1991. The applicants claimed that their conviction violated Article 9 of the European Convention, which safeguards freedom of thought, conscience, and religion, as well as the right to manifest one's religion alone or in community with others and in public or in private.

On May 25, 1995, the 25 members of the Commission came to the *unanimous* decision that in this case Greece had violated Ar-



The original Kingdom Hall sealed by the police on September 20, 1993

ticle 9 of the European Convention. Their pronouncement was that the conviction in question was not compatible with the spirit of religious freedom and was not necessary in a democratic society. This decision as to the admissibility of the case also stated: "The applicants . . . are members of a movement whose religious rites and practices are widely known and authorized in many European countries." Finally, the Commission referred the case to the European Court of Human Rights.

Jehovah's Witnesses Cannot Be Stopped

The hearing was set for May 20, 1996. There were over 200 in the courtroom, including students and professors from the local university, journalists, and a number of Jehovah's Witnesses from Greece, Germany, Belgium, and France.

Mr. Phédon Vegleris, professor emeritus at the University of Athens and attorney for the Witnesses, maintained that the policy used and the judgments rendered by the national authorities violated not only the European Convention but also the Constitution of Greece. "So it is national law and its application which are taken up by the Court."

The attorney for the Greek government was a judge from the Council of State, who, instead of discussing the facts, referred to the position taken by the Orthodox Church in Greece, to its close ties with the State and the people, and to the alleged need to keep



The European Court of Human Rights, Strasbourg

other religions in check. Furthermore, he stated that from 1960 onward, Jehovah's Witnesses had succeeded in greatly increasing their numbers. In other words, the Orthodox monopoly had been successfully challenged!

Religious Freedom Upheld

Judgment would be delivered on September 26. Suspense ran high, especially for Jehovah's Witnesses. The President of the Chamber, Mr. Rudolf Bernhardt, read out the decision: The Court, composed of nine judges, held *unanimously* that Greece had violated Article 9 of the European Convention. It also awarded the applicants the sum of about \$17,000 to cover expenses. Most important, the decision included many noteworthy arguments in favor of religious freedom.

The Court noted that Greek law allows for "far-reaching interference by the political, administrative and ecclesiastical authorities with the exercise of religious freedom." It added that the procedure required to obtain a permit was used by the State "to impose rigid, or indeed prohibitive, conditions on practice of religious beliefs by certain non-orthodox movements, in particular Jehovah's Witnesses." The fierce tactics used by the Orthodox Church for so many decades were exposed by this international court.

The Court stressed that "the right to freedom of religion as guaranteed under the



Witnesses involved: T. Manoussakis, V. Hatzakis, K. Makridakis, K. Baxevanis

Convention excludes any discretion on the part of the State to determine whether religious beliefs or the means used to express such beliefs are legitimate." It also stated that "Jehovah's Witnesses come within the definition of 'known religion' as provided for under Greek law.... This was moreover conceded by the Government."

Not a Mere Joke

During the next few days, most of the major Greek newspapers publicized this case. On September 29, 1996, the Sunday edition of *Kathimerini* made the comment: "As hard as the Greek State tries to pass it off as 'a mere joke,' the 'slap in the face' that it received from the European Court of Human Rights in Strasbourg is an actual fact, a fact that has been duly chronicled on an international scale. The Court reminded Greece of Article 9 of the Convention on Human Rights, and it unanimously condemned the Greek legislation."

The Athens daily *Ethnos* wrote on September 28, 1996, that the European Court "condemned Greece, ordering it to pay its citizens who happen to suffer the misfortune of being Jehovah's Witnesses."

One of the applicants' attorneys, Mr. Panos Bitsaxis, was interviewed on a radio program and said: "We are living in the year 1996, on the verge of the 21st century, and it goes without saying that there should be no discrimination, harassment, or intervention on the part of the administration in connection with the exercise of the fundamental right to religious freedom.... This is a good opportunity for the government to reexamine its policy and put a stop to this sense-

less discrimination, which serves no purpose whatsoever in this day and age."

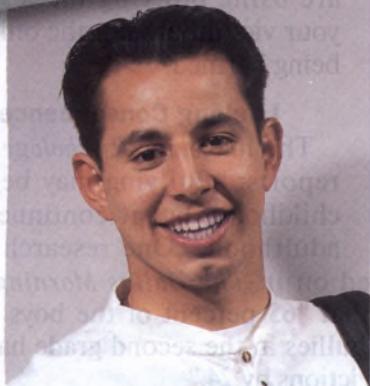
The decision in the case *Manoussakis and Others v. Greece* gives rise to the hope that the Greek State will bring its legislation in line with the European Court's judgment, so that Jehovah's Witnesses in Greece may enjoy religious freedom without administrative, police, or church intervention. Furthermore, this is the second judgment rendered against the Greek judiciary by the European Court on matters relating to religious freedom.*

It is widely known that Jehovah's Witnesses obey the governmental "superior authorities" in all matters that do not conflict with God's Word. (Romans 13:1, 7) In no way do they constitute a threat to public order. On the contrary, their publications and public ministry encourage everyone to be a law-abiding citizen and to live a peaceful life. They are an upright and well-established religion, and their members have contributed much to the well-being of their neighborhoods. Their resoluteness in upholding the high moral standards of the Bible and their love of neighbor, as expressed especially in their Bible educational work, have had a wholesome effect in the more than 200 lands where they exist.

It is hoped that the decisions handed down by the European Court will serve to bring greater religious freedom to Jehovah's Witnesses and all other religious minorities in Greece.

* The first decision, issued in 1993, was the case of *Kokkinakis v. Greece*.—See *The Watchtower*, September 1, 1993, page 27.

**Young
People
Ask...**



Bullying What's the Harm?

**'Hey! I was only having a little fun.
What's the big deal?
Besides, Ron deserved it.'**

YOU may be bigger and stronger than most of your peers. Or perhaps you are quick-witted, sharp-tongued, and aggressive. In any event, intimidating, teasing, or getting a laugh at someone else's expense seems to come easily to you.

Although bulldozing others may get a laugh out of your friends, it is no light matter. In fact, some researchers are finding that bullying is more damaging to its victim

than they ever imagined. One survey of U.S. school-age youths found that "90 percent of those bullied said they suffered side effects—a drop in grades, an increase in anxiety, a loss of friends or social life." In Japan one 13-year-old "hanged himself after leaving a lengthy note that detailed three years of bullying."^{*}

Just what makes a person a bully? And if you are behaving like one yourself, how can you change?

What Is a Bully?

The Bible tells of bullies who lived before the Noachian Flood. They were called the Nephilim—a word that means "those who cause others to fall down." During their reign of terror, "the earth became filled with violence."—Genesis 6:4, 11.

However, you don't have to hit or push people around to be a bully. Anyone who treats other people—especially those who are weak or vulnerable—in a cruel or abusive way is a bully. (Compare Ecclesiastes 4:1.) Bullies try to threaten, intimidate, and control. But most use their mouths, not their fists. In fact, emotional bullying is the most frequent form of this abuse. It can thus include insults, sarcasm, ridicule, and name-calling.

Sometimes, though, bullying can be subtle. Take, for example, what happened to Lisa.[#] She grew up with a group of girlfriends. But when she was 15 years old, things began to change. Lisa became very pretty and started to attract a lot of attention. She explains: "My friends started leaving me out and saying mean things about me behind my back—or even to my face." They also spread lies about her, trying to ruin her reputation. Yes, provoked by jealousy, they bullied her in a callous and cruel way.

* For a discussion of how victims of bullying can avoid harassment, see "Young People Ask . . . What Can I Do About School Bullies?", in our August 8, 1989, issue.

[#] Some names have been changed.



The Making of a Bully

Aggressive behavior is often related to one's home environment. "My father was aggressive," says a youth named Scott, "so I was aggressive." Aaron also had a difficult home life. He recalls: "I realized people knew about my family situation—that it was different—and I didn't like people feeling sorry for me." So when Aaron engaged in sports, he had to win. But winning wasn't enough. He had to *humiliate* his opponents—rubbing their noses in their defeat.

Brent, on the other hand, was raised by God-fearing parents. But he admits: "I would make people laugh, but sometimes I didn't know when to stop, and I'd hurt someone's feelings." Brent's desire to have fun and to attract attention to himself caused him to disregard other people's feelings.—Proverbs 12:18.

Other youths seem to be influenced by television. Crime dramas glorify 'tough guys' and make it seem that being kind is unmanly. Popular comedies are filled with sarcasm. News reports often highlight the fighting and rough talk that goes on during sporting events. Our friends can also affect

Verbal abuse is a form of bullying

the way we treat others. When our peers are bullies, it is easy for us to jump on the bandwagon to avoid being picked on ourselves.

Whatever your situation, if you are using bullying tactics, then your victims are not the only ones being harmed.

Lifelong Consequences

The magazine *Psychology Today* reports: "Bullying may begin in childhood, but it continues into adulthood." One research study reported on in *The Dallas Morning News* found that "65 percent of the boys identified as bullies in the second grade had felony convictions by 24."

True, not all bullies become criminals. But making a habit of running roughshod over others could create real problems for you later in life. Carried over into marriage, it could result in severe distress for your spouse and your children. Since employers favor those who know how to get along well with others, it could deny you job opportunities. Future privileges in the Christian congregation could likewise be withheld. "Someday, I would like to qualify to serve as an elder," says Brent, "but my dad helped me realize that people won't come to me with their problems if they think that I might say something sarcastic."—Titus 1:7.

How to Change

We do not always see our own faults clearly. The Scriptures warn us that one can even act "too smoothly to himself in his own eyes to find out his error so as to hate it." (Psalm 36:2) So you might try asking a parent, a trusted friend, or a mature Christian for observations. The truth may hurt, but it just

might help you see what changes you need to make. (Proverbs 20:30) "I think listening was the biggest thing that helped me," says Aaron. "Those who were honest told me where I was going wrong. It wasn't always what I wanted to hear, but it was what I really needed."

Does this mean that you have to undergo a dramatic change in your entire personality? No, likely it will just be a matter of re-adjusting your thinking and some of your behavior. (2 Corinthians 13:11) For example, up till now perhaps you have thought of yourself as superior because of your size, strength, or quick wit. But the Bible encourages us to act "with lowliness of mind considering that the others are superior." (Philippians 2:3) Realize that others—regardless of size or strength—have admirable qualities that you do not have.

You may also need to rid yourself of the tendency to be aggressive or domineering. Work on "keeping an eye, not in personal interest upon just your own matters, but also in personal interest upon those of the others." (Philippians 2:4) If you need to speak up, do so without being abusive, sarcastic, or insulting.—Ephesians 4:31.

If you are tempted to resort to bullying, remember that God destroyed the bullying Nephilim. (Genesis 6:4-7; 7:11, 12, 22) Centuries later, in the days of the prophet Ezekiel, God expressed great displeasure toward those guilty of "pushing" and "shoving" helpless ones. (Ezekiel 34:21) Knowing that Jehovah hates bullying can be a powerful incentive for one to make needed changes!

It also helps to meditate on Bible principles prayerfully. The Golden Rule states: "All things, therefore, that you want men to do to you, you also must likewise do to them." (Matthew 7:12) When tempted to intimidate someone, ask yourself: 'Do I like to

be shoved around, intimidated, or humiliated? Then why do I treat others that way?' The Bible commands us to "become kind to one another, tenderly compassionate." (Ephesians 4:32) Jesus set a perfect example in this regard. Although he was superior to all other humans, he treated everyone with kindness, empathy, and respect. (Matthew 11:28-30) Try to do the same if you are confronted with someone who is weaker than you—or even gets on your nerves.

What, though, if your aggressive behavior springs from feelings of anger over the way

"Bullying may begin in childhood, but it continues into adulthood"

you are being treated at home? In some cases, such anger may be justified. (Compare Ecclesiastes 7:7.) Yet, the Bible tells us that the righteous man Job was warned: "Take care that rage does not allure you into spiteful [actions] . . . Be on your guard that you do not turn to what is hurtful." (Job 36:18, 21) Even if you are being mistreated, you have no right to mistreat others. A better approach would be to try to talk things over with your parents. If you are a victim of severe mistreatment, outside help may be required to protect you from further harm.

Changing may not be easy, but it is possible. Says Brent: "I pray about this almost every day, and Jehovah has helped me to make some good refinements." As you likewise make refinements in the way you treat people, you will no doubt find that people will like you better. Remember, people may fear bullies, but no one really likes them.

A Century and a Half of SUBWAYS

BY AWAKE! CORRESPONDENT IN HUNGARY

THE tunnel diggers gazed in disbelief at what they had uncovered. The year was 1912. Deep beneath the streets of New York City, while excavating an extension of the newly built subway, they had broken into a large hidden chamber. The room was magnificently furnished—like a palace! Along its length were mirrors, chandeliers, and frescoes. Wood paneling, crumbling with age, still adorned the walls. In the middle of the room stood a decorative fountain, its bubbling long silent.

The room led to a tunnel. To the workers' astonishment, there sat a graciously decorated 22-passenger subway car on its rails. Had there been another subway under New York before the one they were digging? Who could have built this place?

Tunnels and Underground Railways

Underground passages have been in use for mining, supplying water, and military exploits for thousands of years. Mechanized underground transport of passengers, however, came about much more recently. In the early 1800's, thoroughfares in London, England, were choked with every imaginable type of contemporary vehicle, not to mention pedestrian traffic. Thousands crossed the Thames daily, either by ferry or over London Bridge. At times, progress was so slow that merchants could only watch helplessly as the produce they were trying to get to market withered in the sun.

Marc Isambard Brunel, a French engineer living in England, had an idea that would

eventually help to alleviate some of London's transportation troubles. Brunel had once observed a shipworm working its way through a piece of hard oak. He noted that only the head of the little mollusk was protected by a shell. The shipworm used the serrated edges of its shell to bore through the wood. As it progressed, it left behind in its burrow a smooth protective coating of lime. Applying this principle, Brunel patented a large cast-iron tunneling shield, to be pushed forward through the ground by jacks. As workers removed the earth from inside the shield, the shield would prevent collapse. As the shield progressed, other workers would lay bricks on the inside surface of the new tunnel to support it.

Using his shield, Brunel successfully completed the world's first underwater tunnel through soft earth, under the Thames, in 1843. In doing so, he demonstrated the feasibility of tunnel construction and prepared the way for the development of modern subways. In 1863, the world's first subway system opened between principal railroad terminals in London, and in 1865, Brunel's tunnel was purchased to expand the system. That tunnel still forms part of the London Underground.

Fears—Imaginary and Legitimate

Subterranean transport has never been without its opposers. In the 1800's many people, believing that a fiery hell lay somewhere inside the earth, feared going underground. Additionally, many people associat-

ed dark, dank tunnels with contagion and a poisonous atmosphere.

On the other side of the issue, city planners had become passionate in their desire to do something about congested urban roadways. Subways became a major topic of political debate. There was reason for concern regarding subway air quality. Various ventilation schemes were tried out, not all successful. Some took advantage of the air movement produced by the trains; others had vertical shafts with street-level gratings at intervals, powerful fans, or systems combining methods. To counter the psychological barriers to entering dark, underground passageways, stations were outfitted with gaslights. Against such a background, the forgotten New York subway that workers stumbled across in 1912 came into being.

New York's First Subway

Across the Atlantic from London, another talented inventor, Alfred Ely Beach, puzzled over the equally dire traffic situation in New York. As the publisher of the journal *Scientific American*, Beach was a promoter of modern solutions to old problems, such as clogged streets. In 1849 he offered a radical plan: "Tunnel Broadway," one of the most congested streets, "with openings and stairways at every corner. This subterranean passage is to be laid down with double track, with a road for foot passengers on either side."

During the following two decades, other transportation developers also presented rapid-transit proposals for New York. All of these were ultimately voted down. Corrupt political strongman Boss Tweed did not want any competition with surface transportation companies, the source of much of his illegal income. But the resourceful Mr. Beach, who had never abandoned his idea, outwitted the boisterous Boss.

Beach obtained a legal franchise to construct a pair of adjacent tunnels, too small

for transporting passengers, under Broadway. These were to serve "for the transmission of letters, packages and merchandise" to the main post office. He then applied for an amendment allowing him to build just one large tunnel, purportedly to save expense. Somehow his ruse went unnoticed, and the amendment was approved. Beach went to work immediately but out of sight. He dug from the basement of a clothing store, removing the dirt by night with wagons having wheels muffled for silence. In just 58 nights, the 312-foot tunnel was finished.

A "Rope of Air"

Beach was very conscious of the gagging pollution in the London subways, a result of using coal-burning steam engines. He impelled his car with a "rope of air"—the pressure from a huge fan built into an alcove on one end of the tunnel. The air gently pushed the car along at six miles per hour, though it could have gone ten times faster. When the car reached the other end of the line, the fan was reversed to suck the car back! To overcome people's lingering hesitancy to venture underground, Beach made sure that the spacious waiting room was abundantly illuminated with zircon lamps, among the brightest and clearest then available. And he furnished it lavishly with plush chairs, statues, curtained false windows, and even a grand piano and a goldfish tank! The little line was opened to an unsuspecting public in February 1870 and was an immediate, stunning success. In one year, 400,000 people visited the subway.

Boss Tweed was furious! Political maneuvering ensued, and Tweed persuaded the governor to approve an opposing plan for an elevated train costing 16 times as much as the pneumatic underground system proposed by Beach. Shortly thereafter, Tweed was indicted, leading to his imprisonment for life. But a stock-market panic in 1873

turned the attention of investors and officials away from subways, and Beach finally sealed up the tunnel. So it rested in oblivion until it was accidentally unearthed in 1912, more than seven years after the opening of New York's present subway in 1904. A portion of Beach's original tunnel later became part of the present City Hall Station, in downtown Manhattan.

The Millennium Underground Railway

A little more than a century ago, there was an air of anticipation in Hungary. In 1896, Hungary was to celebrate the 1,000th anniversary of its founding. By the end of the 19th century, the country's capital, Budapest, would be among the largest cities in Europe. Already its streets were overcrowded. A surface electric railway was proposed for the millennium celebration, to lighten the load. But the idea was not what the municipal authorities were looking for, and the proposal was rejected. Meanwhile, the London Underground had excited the imaginations of transportation planners in other countries. One such expert in Hungary, Mr. Mór Balázs, put forward the idea of an electric subway. This was approved, and construction began in August 1894.

The subway was built using the cut-and-cover method—an existing roadway was dug up, and rails were laid below street level. A flat roof was then built over the trench, and the roadway was replaced. On May 2,

1896, the 2.3-mile subway was inaugurated. A ride in its individual electrically propelled cars was a great improvement over the sulfurous experience endured by riders on the first London Underground! A few days after it opened, King Francis Joseph I visited the new system and approved its being named after him. During the politically stormy times that followed, however, the line was renamed the Millennium Underground Railway. It was the first subway on the European continent. Soon, others followed. In 1900 the Paris Métro went into operation, and Berlin began subway service in 1902.

The Underground Railway After 100 Years

For Hungary's 1,100th anniversary in 1996, the underground railway was restored to its original beauty and style. Tiny white tiles and wine-red ornamental borders decorate the station walls. Station names stand out—framed in tile on the wall. The iron pillars have been reconstructed and are painted green to evoke the atmosphere of the past century. The central station of Budapest includes a railway museum, where you can see one of the original subway cars—over 100 years old! Exhibits relating to the construction of the Millennium Underground Railway as well as the more modern Budapest Metro are also on display.

When visiting the museum, Jehovah's Witnesses in Hungary cannot help but recall that not long ago the underground railway had quite another function for Christians living here. All through the time that their work was banned in Hungary, Witnesses discreetly used the stations of this famous railway to talk to others about God's Kingdom. Since 1989, the Witnesses have enjoyed freedom to preach in Hungary. But you may still find them in the Millennium Underground Railway, sharing their belief that the Millennium described in the Bible—the 1,000-year rule of Christ—will soon arrive.

IN OUR NEXT ISSUE

**A Global Garden
—Dream or Future Reality?**

**Can a Marriage
Be Saved After Infidelity?**

Tiny Light-Bearers of New Zealand



GIZELLA-TÉR



The Legacy of the First Subways

Today subways ferry passengers underground in major cities around the world. In some the old problems of noise and air pollution have been joined by the challenges of graffiti and crime. But many systems reflect the gracious, aesthetic, and practical ideals of early subway designers. The desire to expand and improve mass transit remains strong. Subways have recently been completed or are under construction in such cities as Bangkok, Medellín, Seoul, Shanghai, Taipei, and Warsaw. Would the first subway designers be surprised at all of this? Perhaps not —such widespread use is exactly what they foresaw a century and a half ago.

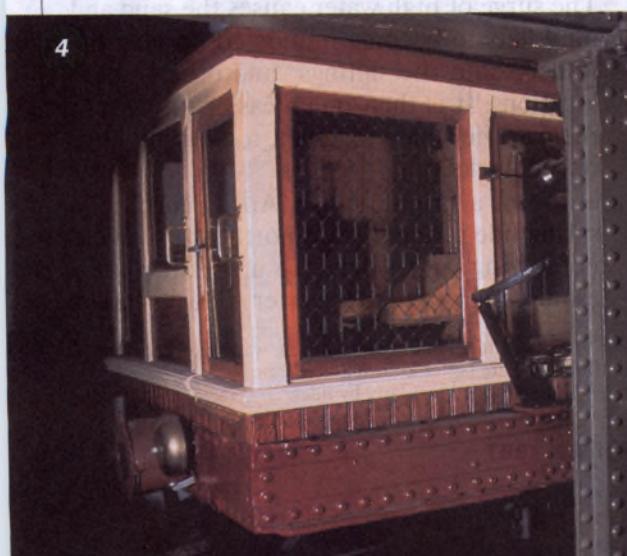


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1. A restored station in Budapest's Millennium Underground Railway Museum

2-4. One of the 1896 Millennium Underground Railway's original electric subway cars



4



High-Tide Rush Hour



Five oystercatchers

By Awake! correspondent in Britain

ABOUT ten million birds winter in northwestern Europe each year. They come not only from arctic breeding grounds but also from as far afield as Canada and central Siberia. On their way to Africa, many others converge on the East Atlantic Flyway, a migration route across the British Isles.

Food and havens for rest are provided by a chain of over 30 large estuaries in British waters. Each of these caters to more than 20,000 birds, but the most important is The Wash, on England's east coast, which hosts more than a quarter of a million birds—including curlews, dunlins, godwits, knots, oystercatchers, plovers, redshanks, and turnstones. What kind of food do estuaries provide, and why are they so important?

The Importance of Estuaries

Estuaries are semienclosed coastal areas where sea water mixes with fresh water. Here the warm waters, rich in both mineral and organic nutrients, sustain one half of the living matter of the world's oceans. Shrimps, sand hoppers, and other forms of life are found in sand, but estuarine mud sustains an even greater abundance of life.

Mud varies according to the size of sediment from which it is made. Each mud type contains its own special marine animals, the food consumed by waders.* For example, in a square yard of one kind of mud, there can be millions of tiny snails that are less than an eighth of an inch long! In addition, mud nurtures mollusks, lugworms, and rag worms, along with other invertebrates.

Spring Tides

Even though there can be many thousands of waders on an estuary, it may be hard to locate them because they are usually scattered over vast areas. When the spring tides arrive, however, the situation changes dramatically. The surge of high water causes the sand and mud flats to become inundated, forcing the waders onto the salttings[#] and other higher locations. It is then much easier to observe them as they mass together, roosting in huge mixed flocks.

Today, a bright, sunny April morning, a spring tide is due. A cold northeasterly wind is blowing as we drive to a small, picturesque estuary where the river Alde meanders

* In the United States and Canada, waders (order Charadriiformes) are better known as shorebirds.

[#] Land flooded regularly by tides.



Knots rushing from their roost

through the English county of Suffolk into the North Sea. Here, the winter wader population peaks at just over 11,000, and we will find it much easier to observe their activity, as the estuary is only half a mile wide.

A complex of broken sea defenses follows the course of the river. Some banks are covered with reeds, others with marram grass. The remainder consist of bare black timber-works and stone. Just upstream, amid a remarkable collection of Victorian buildings, is the Snape Maltings Concert Hall, home of the Aldeburgh music festival. But we must walk downriver and head for a sheltered spot. The wind is now strong and biting, and our eyes are soon smarting.

As soon as we arrive at the river's edge (see picture, point A), we are greeted by the clear, liquid call of a pair of avocets. They are no more than 40 yards away, on our side of the estuary, presently engaged in mutual pair-bond preening. Each bird nibbles the sides of its upper breast with the tip of its

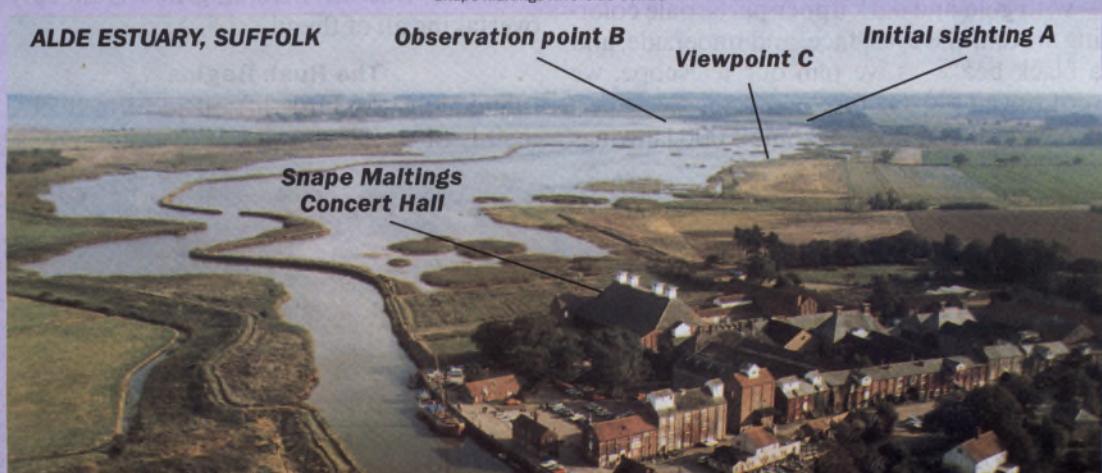
slender, upturned bill. This is delightful to watch, but we must press on, as there is much more to see.

The Rising Tide

The tide is rising quickly now, so we move smartly to our chosen observation point. (See picture, point B.) On the way a redshank—living up to its reputation as sentinel of the estuary—lifts off from the saltlings, with its shrieking call of alarm, "tuhuhu-tuhuhu!" Its red legs contrast with the brilliant white trailing edge of its wings glinting in the sunlight. Upon arriving at our destination, we quickly scan the rapidly shrinking sand and mud flats.

In the distance a score of redshanks feed steadily, lightly probing the mud, while others search for food in more sheltered inlets. Dunlins, with their characteristically down-turned beaks, stick closer together, in small groups. In straggling line they hurriedly pick

Snape Maltings Riverside Centre



To enjoy a high-tide rush hour, first of all locate a convenient estuary. You will then need some information about the area, such as where the



Enjoy the Rush Hour

waders go and where to view them. Consult tide tables for a high spring tide that occurs just after a full or new moon. In addition to travel time, allow three hours for a good look at the birds, and arrive at least two hours before high tide.

What equipment will you need? If you are unfamiliar with waders, take a book to help with identification. A pair of binoculars can be very useful too. You

will soon learn that each species of wader has its own characteristics and collects food in the manner for which its beak was created. A telescope is not essential—but warm, waterproof clothing is! Be alert to dangers. Do not venture out on mud flats unless you know them well. It is easy to get trapped by a rapidly rising tide. Furthermore, it takes only a sea mist to drop for you to get lost. Consider the wind, as well. Gales can cause surge tides, which can be very hazardous on any estuary.

their way along the mud, tending to keep close to the water's edge. Scattered curlews amble by, carefully probing the soft, slimy ooze. Farther upstream, a couple of turnstones are locating food by using their short, slightly upturned beaks to roll back tide-line debris on the old sea bank.

Suddenly, the wild, wistful, trisyllabic whistle "tlee-oo-ee" of the gray plover fills the air. As it flies overhead, the bird's black axillaries show up clearly against the rest of its pale underside. Four hundred golden plovers, closely packed in an oval formation, rest with head under wing, all facing the wind. There is the occasional dispute between a couple as pecking order is reaffirmed. The majority are still in their speckled winter plumage—with gold and dark upper parts; pale coloring around the eyes, face, and underside; and a black beak. As we pan our telescope, we spot ringed plovers too.

A widespread flock of some 1,000 lapwings

suddenly arrives. The birds approach in gay abandon, flopping through the sky in their imitable way. The lapwings and the golden plovers have been on the arable land to the west, their more favored feeding zone. They come to the estuary not just to feed but to bathe and preen their feathers.

The main background noise is from the bubbling call of curlews, the more contented musical whistle of redshanks, and the squawking of black-headed gulls. Two bar-tailed godwits probe deep into the mud. With their thick orange-red bills, a few oystercatchers are pulling out lugworms. A lone gray plover takes a few stately steps, stops, shakes the right foot, then goes after its prey, and swallows. But the incoming tide is quickly overtaking all of them!

The Rush Begins

Suddenly, the birds lift off to form flocks, mainly of their own species. It is an impres-

Redshank



Curlew



sive sight, for the waders fly in tightly packed formation. Banking from side to side, flocks change color as the sun's rays catch them—from dark brown to shining silver-white—one moment clearly visible and the next, almost merging with the background of the muddy incoming tide. Dark to silver, silver to dark, in perfect rhythm and, at the same time, constantly changing shape—from roughly oval to round, then to a spiral, and finally to a vertical line. Most drop back to mud flats yet to be covered by the tide.

Soon, the mud and sand flats around us will be inundated, so we hurry upriver, accompanied by a steady stream of waders. First to overtake us are small flocks of tiny dunlins, with their fast wingbeats, maintaining contact by occasionally uttering their short, shrill whistle. Then, the bigger redshanks pass, their flock more spread out and stately. Curlews the size of large gulls fly by, fluting their lovely, bubbling mellow trill as they go. Avocets follow in one big flock, contrasting black and white against the blue sky. They settle at the top of the estuary, their long, slate-blue legs just visible above the water.

The Roost

We quicken our pace to reach an elevated point where the estuary narrows. (See picture, point C.) Species tend to flock together, though this is clearly not a rule. As the tide continues to rise swiftly, more birds join the throng. This causes constant reshuffling as standing room becomes more difficult to find on the banks, with an ever-increasing demand for space from those arriving late.

The high tide is upon us now. The lapwings and golden plovers have flown back to the arable land. All the remaining birds have been forced off the mud to roost on the old riverbanks. The constant piping of the oystercatchers is all out of proportion to their numbers. The redshanks and curlews add to the



Main Global Estuaries

The Wadden Zee, in the Netherlands, is the most important intertidal area in Europe and at times holds probably over four million waders. It stretches northward to southwest Jutland. Three good locations to visit in this vast area are the causeway to Rømø, in Denmark; The Weser River estuary, a major high-tide roost, in Germany; and Lauwers Zee near Groningen, in the Netherlands. On the Iberian Peninsula, the most significant estuary is that of Portugal's Tagus River.

Estuaries along the Pacific seaboard of both North and South America provide food for some six to eight million wader migrants. Among the main locations are San Francisco and Humboldt bays, in California; the 80 square miles in Canada from Vancouver's Boundary Bay around to Iona Island, British Columbia; and Alaska's Stikine estuary and Copper River delta.

Excellent sites for waders are also to be found at Bolivar Flat and Galveston, in Texas, U.S.A.; at Tai-Po, in Hong Kong; at Cairns, in northeastern Australia; and near Mombasa, Kenya.

Above: Curlews

background clamor, which is now transcended by a skylark singing overhead—a truly wonderful atmosphere.

We take our leave as the waders enjoy their well-deserved afternoon roost, sitting out the high spring tide. In spite of the fact that some are behind the seawall and cannot see the water, the birds will know when to return to their mud flats or sandy shores. Perfect time-keepers, instinctively wise, they know how the tides work.

Yes, a high-tide rush hour is thrilling to watch, especially for the first time!

WATCHING THE WORLD

Unholy Water

A surgeon in Ireland was puzzled when a 72-year-old woman twice developed serious eye infections just prior to having cataract surgery. What caused the infections? "Holy" water from Lourdes that she had put on her face. "The problem," says *The Irish Times*, "is that holy water is often contaminated by dangerous bacteria." The woman might easily have been blinded by the infection if the surgery had been performed as scheduled. *The Irish Times* continues: "Blessing simply doesn't kill germs. And the sprinkling of holy water that is meant to cure, may actually cause life-threatening infection in certain circumstances." According to the report, well-meaning friends or relatives who sprinkle you with "holy" water when you are in the hospital may be "the greatest risk to your survival."

Land-Mine Dilemma

"The global campaign to rid the world of land mines has found that the objective is as elusive as the mines themselves," notes *The Wall Street Journal*. "Adequate equipment doesn't exist to ensure the safe removal of land mines." Soldiers today use the same basic equipment that their grandfathers used in World War II—sticklike probes and metal detectors. But the new generation of mines are much harder to detect, as they are mostly plastic and lie buried with shrapnel and other debris that trigger many false alarms. When the metal detector senses an object, a fiberglass rod is carefully pushed into the soil at

an angle. The object is to find the mine by hitting its side. If the mine is at an angle and the top is hit, it will blow up in the person's face. While mines often cost less than \$5 each, clearing them out can cost more than \$1,000 per mine. Between 1.5 million and 2 million mines are placed in the ground each year, and over 25,000 people—including many children—are maimed or killed by them.

No Way Out for Children

"Children in general started to become victims of their elders' quarrels when warfare became total: bombs and missiles make no age distinction in their



killing," states *The Economist*. "Civil wars—the common ones nowadays—often consume entire countries. In some places aid agencies now have to give as much attention to demobilizing child soldiers as to supplying basic foodstuffs. Everywhere they go they can expect to find children among the refugees, the wounded and the dead." Although everyone claims to love children, it is children who are suffering more than ever before. Aid agencies estimate that 24 million children under 18 years of age were displaced by war last year and that some 2 million were killed in the past ten years.

An additional four million to five million were disabled. "The psychological effects can only be guessed at," says *The Economist*.

Celibacy Controversy

"The Roman Catholic Church is losing a great deal of qualified labour due to its insistence on celibacy for priests," according to a report published in the *ENI Bulletin*. At the Fourth International Congress of Married Priests, held in Brasilia, it was reported that 100,000 Roman Catholic priests throughout the world have left the priesthood and have given up celibacy. According to former priest Jorge Ponciano Ribeiro, now a professor at the University of Brasilia, 1 out of every 5 priests has left the priesthood to get married. Brazil alone has 3,500 married priests. Said Ribeiro: "Celibacy was established to avoid problems between the church and the priests' heirs, and not because the Word of God can be better disseminated by those who do not engage in sexual relations."

Elephant Delinquents

"Like children, young elephants need discipline if they are to grow up as responsible members of society," notes *New Scientist*. "Wildlife biologists say that orphan bull elephants in South Africa's Pilanesberg Game Reserve have turned delinquent because they have never been taken in hand by their elders." The rogue elephants have attacked humans, have gored to death 19 white rhinoceroses in the past three years, and

have even tried to mate with rhinos. Two humans were killed, including a professional hunter sent out to shoot an offending elephant after it had charged a group of tourists. In each instance, the delinquent animal was from a group of young male elephants brought into the reserve from Kruger National Park after the rest of their herd was culled to control the size of the elephant population. While a number of factors have placed stress on the elephants, scientists feel that the lack of discipline and nurturing from older animals, a dominant feature of the normal life of elephant families, is at least partly responsible for their wayward behavior. Now, only whole elephant families will be moved so that the young bulls "will continue to receive the strict parental discipline they need," says the article.

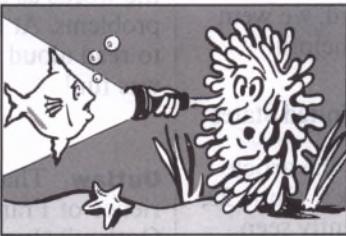
First Hit-and-Run Accident in Space

The first confirmed hit-and-run accident in space has occurred over 400 miles above the earth, reports *New Scientist*. A French satellite called Cézanne went tumbling wildly when a stabilizing boom was vaporized after being hit by a ten-year-old chunk of an Ariane rocket that was traveling at 30,000 miles per hour at the same altitude. The chances of such collisions increase yearly as debris accumulates in earth orbits. Already, there are more than 20,000 known pieces of space junk hurtling around the globe. While those in low orbits are often eliminated through natural processes, such as expansion of the atmosphere, those in high orbits can remain there for thousands of years. When they collide with other pieces of

debris, they fracture into many smaller pieces that can penetrate an astronaut's space suit or a spacecraft's shield. Even bits of paint are a potential hazard. At present, there are about 4 dead satellites in orbit for every 1 still operating, and spent rockets that have blown up in orbit account for a quarter of the known space debris.

Sponges Had It First

"So many of humanity's bright ideas turn out to be nature's old tricks," states *The Washington Post*. "Take fiber optics, for example. Scientists developed glass-like fibers to capture light and carry it around



corners in 1951. It turns out deep-water sponges in Antarctica's Ross Sea had been doing the same for eons." The giant sponges, found in waters up to 100 feet deep, have fiber spicules sticking out of them that capture light and can transmit it, even around a 90-degree bend, to photosynthetic algae that inhabit the core of the sponge's body. Experiments have shown that light striking at an angle is also gathered, indicating that the spicules on the sides of the sponge are also capable of feeding the algae light.

Gamblers Lose

"Casinos are so made that their owners by no means lose money," says Brazilian econo-

mist Ricardo Gazel. "The mathematical chances that a person will get money from gambling are minimal." Warning that easy access to casinos will most likely create more gambling addicts, Gazel adds: "There is the illusory prospect of earning money without much effort. People dream of the possibility that in a stroke of good luck, they will get rich quick." Further, Veja quotes him as saying regarding the lack of basis for criticism by church or government: "The government is the biggest gambling establishment in the country. There are six different kinds of lotteries maintained by the federal government, not to mention state lotteries. The church cannot criticize the legalizing of gambling because to raise money for the parishes, the church promotes the habit at bazaars, where there is always a small stand at which the faithful lose money betting." According to Gazel, 'specialists say that compulsive gamblers who do not seek help run the risk of ending up in prison, committing suicide, or going insane.'

Snake-Toting Bandits

Thieves have been victimizing residents of Diriamba, a Nicaraguan town 30 miles south of Managua, by using poisonous snakes. As reported in the newspaper *El Nuevo Diario*, the gang would collect the rattlesnakes from nearby fields, remove their venom, and then rob people as they traveled on the roads outside of town by threatening to have the snakes bite them. One girl, who fainted when she saw the snake's fangs, found that when she came to, her gold chains had been stolen. The gang has also robbed peasants of foodstuffs and cash.

FROM OUR READERS

Carnivals Thank you for the article "The Bible's Viewpoint: Carnival Celebrations—Right or Wrong?" (June 8, 1996) I live in Brazil, and carnival is a very exciting time here. I was always tempted to join in the celebrations. I knew it was wrong, but I didn't really understand why. This article, though, showed clearly that the carnival includes revelry and that God views such celebrations as "works belonging to darkness."—Romans 13:12.

F. M. M., Brazil

Vacations Thank you so much for the series "Going on Vacation?—What You Should Know." (June 22, 1996) It came just in time because only a few days afterward, we went on vacation. The tips were very helpful. Thanks again.

L. J., United States

Lyme Disease Thank you for the article "Lyme Disease—Are You at Risk?" (June 22, 1996) As a physician, I have recently seen quite a few patients with this disease, and I can confirm the precautions you mentioned. In most cases patients are not taken seriously and suffer for a long time. *Awake!* dealt with the arthritic type, which is prevalent in the United States. Two other pathogens have been discovered in Europe, for which traditional laboratory tests do not work. Antibiotics are only effective for Lyme disease in the early stages and are often ineffective later on.

I. S., Germany

As a Lyme disease sufferer, I found this wonderful article very encouraging. I hope all who read it will take this disease seriously and take all necessary precautions.

D. P., United States

Learning Disorders I really appreciated the article "Young People Ask . . . Why Can't I Learn?" (June 22, 1996) I am struggling in

school for some of the reasons mentioned in the article. I am going to apply your suggestions. Thank you very much.

R. C., United States

I was totally losing interest in learning and wasn't concentrating in school. By putting into practice the suggestions given in the article, I hope to improve my learning habits.

M. E. O., Uganda

I don't have any learning disorders, but I just don't like to study. I also have trouble remembering mathematical formulas. Well, this article mentioned repetition and mouthing the words as a help for short-term memory problems. At first I thought it would be silly to read aloud to myself, but when I did it, it was fun!

N. I., Japan

Outlaw Thanks for publishing the experience of Franck Mannino, entitled "I Was an Outlaw." (June 22, 1996) It touched me and made me understand how powerful and loving our Creator, Jehovah, is. I have been serving him for 30 years, and this experience has encouraged me to do my very best in the preaching work while I am free to do so.

E. B., Italy

The article helped me to appreciate the privilege of attending Christian meetings. My lack of personal organization has caused me to be habitually late for meetings. Franck Mannino had little freedom while in jail, but his life was very productive.

D. W., United States

I was moved by the zeal Franck Mannino showed, even while he was confined in jail. Although his life started off in a bad way, he is now an excellent example.

C. R., United States

An Expert Gardener

THE South American leaf-cutting ant amazes biologists with its sophisticated gardening techniques. To provide food, this tiny insect cuts leaf fragments and gathers debris from the forest floor and brings these back to its underground nest. The ant then grinds these bits into a mash to feed its fungus garden. This leaf cutter instinctively knows how to keep its crop at an ideal temperature and humidity level to obtain the best results. To create new allotments, it will transfer cuttings from established crops to newer leaf beds. The leaf-cutting ant has even mastered the art of pruning to maximize fungal growth. Welsh research-

ers have observed that this skillful horticulturist adjusts its efforts according to the food needs of the nest, thus conserving time and energy.

Gardening involves hard work, and the leaf-cutting ant is astounding in this regard. Little wonder that the Bible says: "Go to the ant, you lazy one; see its ways and become wise. Although it has no commander, officer or ruler, it prepares its food even in the summer; it has gathered its food supplies even in the harvest." (Proverbs 6:6-8) Truly, the leaf-cutting ant's instinct attests to the wisdom of its Creator, Jehovah God.

—Proverbs 30:24, 25.





A Valuable Magazine

A NURSE from London wrote the following comments to the publishers of Awake!:

"One day I was talking with my new neighbor, Jackie, about my work with the elderly. 'I have some magazines that they may like to read,' she told me. I took her magazines to work and left them on coffee tables. On future visits I noticed that the magazines were well-thumbed, so people were reading them.

"Later I changed my job and began working at a hospital. I put some of my neighbor's magazines in the waiting room. Once again I could see that they were being read. One morning when I was attend-

ing to an elderly lady's hand, her husband said: 'I hope it's all right, but I took this magazine from your waiting room. It has a very good article in it that I want to share with my son.'

"The magazines have been a blessing to me too. Since I am still receiving training in nursing, I have used the information in these articles in my research papers, with good response from my teachers.

"My neighbor Jackie is one of Jehovah's Witnesses, and the magazine I have been referring to is Awake! What I have read in this magazine has helped me understand much about myself and about the future for mankind."