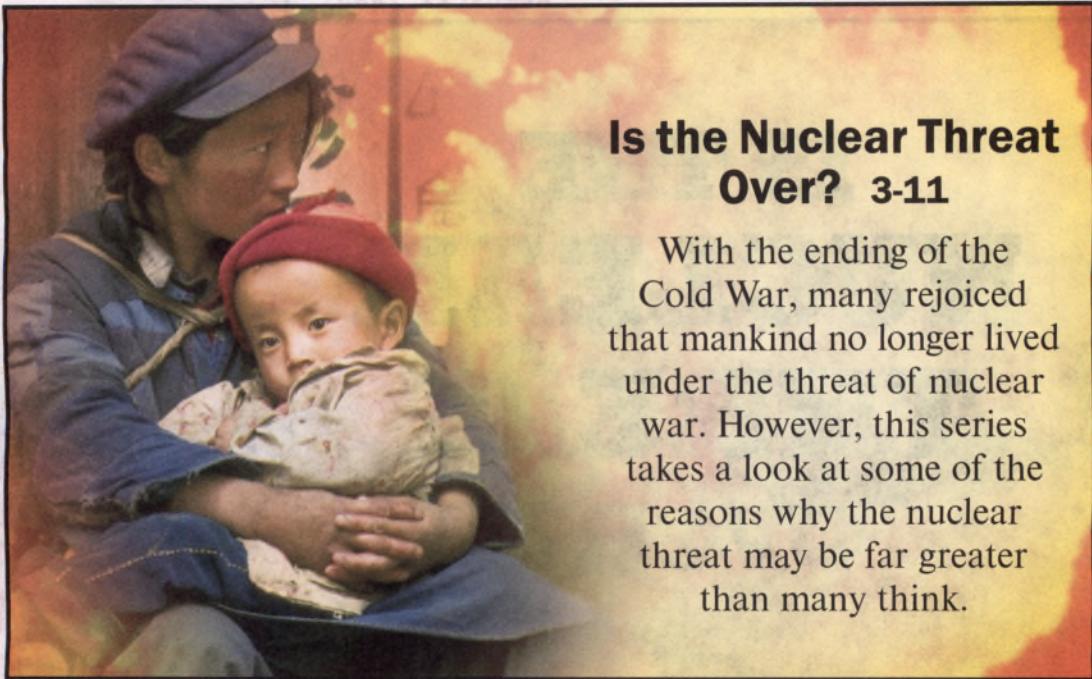


# Awake!

August 22, 1999

## IS THE NUCLEAR THREAT OVER?





## Is the Nuclear Threat Over? 3-11

With the ending of the Cold War, many rejoiced that mankind no longer lived under the threat of nuclear war. However, this series takes a look at some of the reasons why the nuclear threat may be far greater than many think.

Explosion on cover: UNITED NATIONS/PHOTO BY SYGMA

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# An End to the NUCLEAR THREAT?

**F**OR more than 40 years, the world lived under the threat of a nuclear apocalypse. Then, in 1989, the Berlin Wall tumbled down—a prelude to the fall of Soviet Communism. Before long, the superpowers had agreed to stop aiming their missiles at each other. With the nuclear “Armageddon” seemingly called off, or at least postponed, the world heaved a long-awaited sigh of relief.

Many experts feel, however, that it is far too early to celebrate. In 1998 the famous doomsday clock of *The Bulletin of the Atomic Scientists* was moved up five minutes, to nine minutes to midnight—a clear indication that the nuclear threat had not gone away.\* True, the world scene has changed. No longer are two major nuclear powers locked in a nuclear standoff. Now several nations possess nuclear capabilities! In addition, experts fear that it is only a matter of time before some terrorist group get their hands on radioactive material and build a crude atom bomb.

\* The doomsday clock on the cover of *The Bulletin of the Atomic Scientists* is a symbol of how close the world supposedly is to the “midnight” of nuclear war. Over the decades, the clock’s minute hand has been moved to reflect changes in the world’s political climate.

Furthermore, despite dramatic reductions, the United States and Russia still retain awesome arsenals of nuclear warheads. According to a research group called the Committee on Nuclear Policy, some 5,000 nuclear weapons are currently on hair-trigger alert. “Therefore,” their report states, “if a launch order were sent under current circumstances, 4,000 [intercontinental ballistic missile] warheads (2,000 on each side) could be on their way to their targets within a few minutes and another 1,000 [submarine-launched ballistic missile] warheads could be en route to targets shortly thereafter.”

The existence of this arsenal raises the possibility of accidental or even premeditated war. “A fateful accident could plunge the world into the chaos of a thermonuclear catastrophe, contrary to political leaders’ wishes,” warned prominent Russian strategist Vladimir Belous. So while the Cold War may be over, the threat of a nuclear holocaust has not really gone away. But just how great is that threat? Will the earth ever be rid of nuclear weapons? The following articles will address these issues.



Explosions on pages 2 and 3: U.S. National Archives photo

# The Nuclear Threat FAR FROM OVER

*"The proliferation of superweapons is now the most dangerous specter facing this planet."*

—CRITICAL MASS, BY WILLIAM E. BURROWS  
AND ROBERT WINDREM.

**A**T DAWN on January 25, 1995, an ominous blip suddenly appeared on early-warning radar screens across northern Russia. A rocket had been launched somewhere off the coast of Norway! Radar operators alerted Moscow to the possible arrival of a nuclear bomb. Within minutes, the Russian president was handed a suitcase containing electronic devices that would allow him to order a devastating nuclear counterattack. All-out nuclear war seemed to be just moments away.

Fortunately, cool heads prevailed, and the trajectory of the rocket was seen to pose no threat to Russia. It was later learned that the projectile carried equipment for meteorologic research. Even so, an article in *The Washington Post* observed: "These may have been some of the most dangerous moments of the nuclear age. They offer a glimpse of

how the high-alert nuclear-launch mechanism of the Cold War remains in place, and how it could go disastrously wrong, even though the great superpower rivalry has ended."

## Hair-Trigger Alert

For decades the nuclear posture of both the former Soviet Union and the United States was based on the deterrence concept known as mutual assured destruction (MAD). One pillar of MAD was the strategy called launch on warning. This gave each side the grim assurance that if they attacked, their enemy would launch a massive retaliation before the attacking warheads could even hit their targets. A second pillar of MAD was the strategy called launch on attack. This referred to the capacity to unleash retaliatory strikes even after enemy warheads had done their damage.

**Awake!**®

U.S. Air Force Photo

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**Dropping a B-61 nuclear bomb,  
which is designed to destroy  
underground facilities**

U.S. Air Force Photo

In spite of the thawing of the Cold War, the specter of MAD still haunts mankind. Yes, U.S. and Russian nuclear stockpiles have been reduced dramatically—some say by as much as half—but thousands of nuclear warheads still exist. There is the possibility, then, that weapons could be launched by accident or without authorization. And because both nations still fear the seemingly unlikely possibility of a first-strike attack, a large number of missiles are maintained on hair-trigger alert.

True, in 1994 the United States and Russia agreed to stop aiming their strategic missiles at each other. "This change, though a welcome gesture, has little military significance," notes *Scientific American*. "Missile commanders can reload target coordinates into guidance computers within seconds."

### New Weapons on the Horizon?

Not to be overlooked is the fact that nuclear weapons research and development continues. In the United States, for example, the annual budget for such weapons is about \$4.5 billion! In 1997, *The Toronto Star* report-

ed: "Paradoxically, the U.S. is now spending more than it did during the cold war on the preservation of its nuclear war machine. And some of that money is earmarked for ambiguous programs that critics say carry the seeds of a new global arms race."

For example, much controversy arose over the multibillion-dollar U.S. government project called the Stockpile Stewardship and Management Program. Although the ostensible purpose of the program is the maintenance of existing nuclear weapons, critics say that it also serves a more sinister purpose. Reports *The Bulletin of the Atomic Scientists*: "There are plans for alterations, modifications, updates, and replacements—not just to extend the life of the nuclear arsenal... but to 'improve' it as well."

In 1997 a furor arose over the development of a nuclear bomb called the B-61, which has the ability to penetrate the earth's surface before detonating. It can thus destroy underground command posts, factories, and laboratories. While proponents claim that it is merely a repackaging of an older bomb, opponents claim that it is indeed a new bomb—a gross violation of promises made by the U.S. government that it would not develop new nuclear weapons.

In any event, Ted Taylor, a nuclear physicist at Princeton University, observed: "My guess is the sort of research now going (in the U.S.) is also going on in Russia, France,

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## Biological and Chemical Threats

Aggressive nations that are too poor to develop nuclear arsenals may turn to medium-range missiles armed with poison gas or with biological weapons. These have been dubbed the poor man's nukes. In fact, many analysts fear that such devices may also become the weapons of choice for terrorist groups.

However, biological and chemical weapons can wreak havoc

even without a high-tech delivery system. U.S. Secretary of Defense William Cohen said in November 1997: "With advanced technology and a smaller world of porous borders, the ability to unleash mass sickness, death, and destruction today has reached a far greater order of magnitude. A lone madman or nest of fanatics with a bottle of chemicals, a batch of

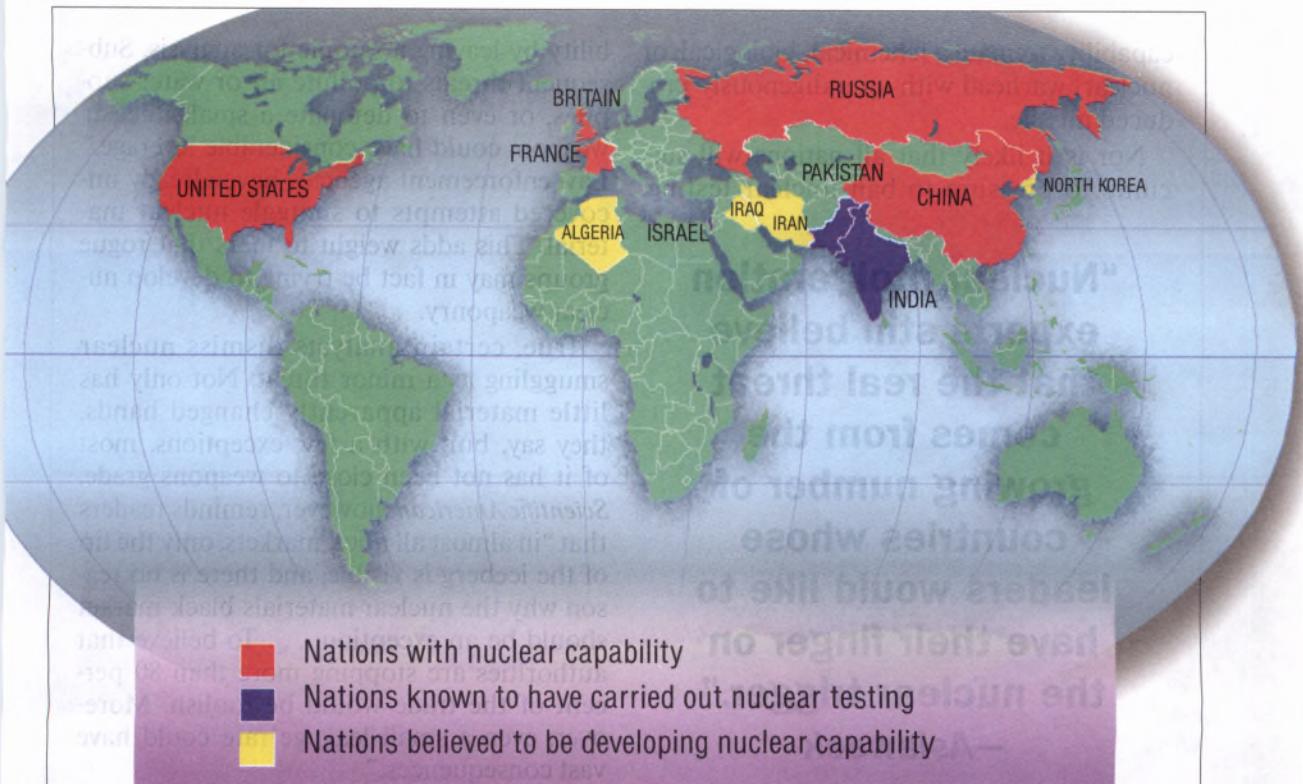
plague-inducing bacteria, or a crude nuclear bomb can threaten or kill tens of thousands of people in a single act of malevolence." Such fears were proved valid when cult terrorists used sarin, a nerve agent, to attack commuters in the Tokyo subway system in March 1995. Twelve people were killed, and 5,500 were injured.

"If a chemical attack is frightening, a biological weapon poses a worse nightmare," notes professor of political science Leonard Cole. "Chemical agents are inanimate, but bacteria, viruses and other live agents may be contagious and reproductive. If they become established in the environment, they may multiply. Unlike any other weapon, they can become more dangerous over time."

In an effort to curb the proliferation of chemical and biological weapons, the 1972 Biological and Toxin Weapons Convention and the 1993 Chemical Weapons Convention have been implemented. *The Economist* notes, however, that despite such good intentions, "no arms-control regime is perfect. . . . They cannot pick up every transgression." The same source remarks: "And, of course, the real cheats are unlikely to sign up anyway."



**Law-enforcement authorities fear that chemical and biological weapons could easily be used by terrorists**



Germany and other places, and I believe that some of our projects are leading the world into a new arms race.” Critics also claim that the research, development, and design of new weapons is being actively promoted by the weapons designers themselves. Bruised egos, dwindling prestige, and financial difficulties may be powerful motivation for these skilled scientists to push for the revival of weapons research.

#### New Powers on the Nuclear Scene

Then there are the changes in the world’s political lineup. Traditionally, five nations used to make up the nuclear club: Britain, China, France, Russia, and the United States. However, it is generally recognized that other countries too have gone nuclear. India and Pakistan, for example, recently conducted nuclear tests that sparked fears of an intense arms race in Southeast Asia. Other na-

tions suspected of having nuclear programs include Algeria, Iran, Iraq, and North Korea. More than 180 nations have signed the Nuclear Non-Proliferation Treaty, which went into effect in 1970. But to date, a number of powers widely suspected of hiding their nuclear ambitions have not signed it.

Reports *Asiaweek*: “Nuclear proliferation experts still believe that the real threat comes from the growing number of countries whose leaders would like to have their finger on the nuclear trigger.” Some observers feel that the Nuclear Non-Proliferation Treaty will simply not be able to stop governments that are determined, despite penalties, to get the technology and materials they need to go nuclear on the sly. James Clapper, director of the U.S. Defense Intelligence Agency, predicted: “By the turn of the century we could see numerous countries with the

capability to mate a [chemical, biological, or nuclear] warhead with an indigenously produced missile."

Nor is it likely that all nations will succumb to pressure to ban nuclear testing.

**"Nuclear proliferation experts still believe that the real threat comes from the growing number of countries whose leaders would like to have their finger on the nuclear trigger."**

**—Asiaweek**

When a number of nations were lobbied to sign the Comprehensive Test Ban Treaty in 1996, an editorial in *Asiaweek* observed: "It is fine for the Americans or the Europeans to preach the gospel of test bans, since they have already detonated enough nuclear devices to be able to sit back on the information they have collected."

#### **Nuclear Smuggling and Terrorism**

Some feel that the greatest threat is that some terrorist group might get their hands on a nuclear weapon and decide to explode—or at least threaten to explode—the device in order to press their political agenda. There are also fears that a criminal organization could similarly use radioactive material for large-scale extortion of a government or corporation. An article in *Scientific American* explains: "It would be fairly easy for a nuclear blackmailer to establish credi-

bility by leaving a sample for analysis. Subsequent threats to pollute air or water supplies, or even to detonate a small nuclear weapon, could have considerable leverage." Law-enforcement agencies have already uncovered attempts to smuggle nuclear material. This adds weight to fears that rogue groups may in fact be trying to develop nuclear weaponry.

True, certain analysts dismiss nuclear smuggling as a minor threat. Not only has little material apparently changed hands, they say, but, with a few exceptions, most of it has not been close to weapons grade. *Scientific American*, however, reminds readers that "in almost all illicit markets, only the tip of the iceberg is visible, and there is no reason why the nuclear-materials black market should be an exception. . . . To believe that authorities are stopping more than 80 percent of the trade would be foolish. Moreover, even a small leakage rate could have vast consequences."

Although the exact amount is a well-kept secret, it is estimated that a nuclear bomb requires between 6 and 50 pounds of enriched uranium or between 2 and 20 pounds of weapons-grade plutonium. To the delight of smugglers, 15 pounds of plutonium takes up roughly the space of a standard aluminum soft-drink can. Some think that even reactor-grade plutonium—which is more easily obtainable than weapons-grade—could be used to build a crude, but still destructive, nuclear bomb. If, as many experts claim, stockpiles of radioactive materials are poorly protected, they may be more vulnerable to theft than most people realize. Mikhail Kulik, a Russian official, quipped: "Even potatoes are probably much better guarded today than radioactive materials."

Clearly, then, nuclear danger, like a Damoclean sword, still hangs over mankind. Is there any hope of it ever being removed?

# A Secure Future AT LAST!

*"The whole earth has come to rest, has become free of disturbance. People have become cheerful with joyful cries."*

—ISAIAH 14:7

**O**URS is a world of nuclear giants and ethical infants. We know more about war than we know about peace, more about killing than we know about living." Those words, spoken by a U.S. Army general in 1948, remind us of the observation found in the Bible: "Man has dominated man to his injury." (Ecclesiastes 8:9) When men are armed with nuclear weapons, they can do worse than injure their fellowmen; they can annihilate them!

Many people agree that the possession and use of nuclear weapons is ethically wrong. For example, George Lee Butler, a retired U.S. Air Force general, said: "The sim-

ple existence of a nuclear weapon in somebody's arsenal continues to send a message that we can imagine circumstances under which . . . somehow we can rationalize the employment of that weapon. That's just wrong."

Nevertheless, British columnist Martin Woollacott observes: "Nuclear weapons retain their attraction, whatever the theorists and the moralists say about their uselessness and viciousness. Governments believe they need them for rational security reasons; they also cling to them because nuclear weapons undoubtedly constitute a kind of dark magic which politicians and soldiers recognise and want to possess."

**In God's new world, families will "dwell in security," and all forms of weaponry will be eliminated**



It is true that for the past five decades, man has somehow managed to avert nuclear war. But during that same period of time, conventional weapons have been used to slaughter untold thousands of people. Given man's track record, it is only reasonable to assume that, sooner or later, these fearsome nuclear weapons would be used.

### **Underlying Causes**

Can man's warlike tendencies be curbed? Some argue that men fight wars because of stupidity, selfishness, and misdirected aggressive impulses. "If these are the primary causes of war," says scholar Kenneth Waltz, "then the elimination of war must come through uplifting and enlightening men."

Others say that the causes of war lie in the structure of international politics. Because each sovereign state pursues its own national interests, conflicts inevitably occur. Since there is no consistent, reliable way to reconcile differences, war breaks out. William E. Burrows and Robert Windrem write in their book *Critical Mass*: "The hard part is political. No effective control regime is possible without an underlying political resolve

**Warlike traits are eliminated as people learn and apply God's Word, the Bible**



to stop and even reverse superweapon proliferation."

Consider the ongoing negotiations to implement the Comprehensive Test Ban Treaty. The *Guardian Weekly* described them as "an intense bargaining session between the nuclear powers and the states who already covertly possess nuclear weapons or have the technology to acquire them quickly." The same article admits: "Neither [group] has any plans to give up their weapons or their capacity, or all the options for improving either."

Obviously, international cooperation is needed if all nuclear threats are to be eliminated. Says the book *Critical Mass*: "Mutual trust must therefore replace mutual assured destruction everywhere, . . . or a cataclysm must sooner or later follow." Unfortunately, international relations and negotiations today often resemble what the prophet Daniel described 26 centuries ago: 'They speak lies over one table.'—Daniel 11:27, *Byington*.

### **Global Cooperation Under a World Government**

Nevertheless, the Bible assures us that God himself purposed genuine global cooperation under a highly effective world government. Millions have unwittingly prayed for this government when uttering the Lord's Prayer: "Let your kingdom come. Let your will take place, as in heaven, also upon earth." (Matthew 6:10) A kingdom

is a government. And the Head of that Kingdom government is the Prince of Peace, Jesus Christ. God's Word assures us: "To the abundance of [his] princely rule and to peace there will be no end . . . The very zeal of Jehovah of armies will do this." (Isaiah 9:6, 7) The Bible promises regarding that government under Jesus: "It will crush

and put an end to all these kingdoms," or human governments.—Daniel 2:44.

This world government will bring in true peace and security—but not by nuclear deterrence or through shaky arms treaties. Psalm 46:9 prophesies that Jehovah God "is making wars to cease to the extremity of the earth. The bow he breaks apart and does cut the spear in pieces; the wagons he burns in the fire." Halfway measures will not be good enough. God's Kingdom under Christ will do more than reduce the number of nuclear weapons—it will totally eliminate them and all other weapons of war.

There will be no nuclear threat because there will be no superpowers, no rogue nations, no terrorists. True peace will prevail: "They will actually sit, each one under his vine and under his fig tree, and there will be no one making them tremble; for the very mouth of Jehovah of armies has spoken it." These inspired words come from the God who cannot lie.—Micah 4:4; Titus 1:2.

According to Psalm 4:8, true peace and security are to be found only within Jehovah God's arrangement: "In peace I will both lie down and sleep, for you yourself alone, O Jehovah, make me dwell in security." As human history has painfully proved, any promises of "peace and security" other than through Jehovah's Kingdom can only be counterfeit.—Compare 1 Thessalonians 5:3.

#### **"Quietness and Security"**

But what about the warlike nature of man himself? "Righteousness is what the inhabitants of the productive land will certainly learn." (Isaiah 26:9) Such instruction in righteousness will have a profound effect on human nature and world conditions: "The work of the true righteousness must become peace; and the service of the true righteousness, quietness and security to time indefinite." (Isaiah 32:17) Any aggressive impulse or violent instinct will be replaced by neighborly love and concern for the common

good. Earth's inhabitants "will have to beat their swords into plowshares and their spears into pruning shears. Nation will not lift up sword against nation, neither will they learn war anymore."—Isaiah 2:4.

In prophetic language Isaiah foretold that people with animalistic tendencies will be transformed. He spoke of a time when "the earth will certainly be filled with the knowledge of Jehovah." As a result, "the wolf will

**"Nation will not  
lift up sword against  
nation, neither will they  
learn war anymore."**

—Isaiah 2:4

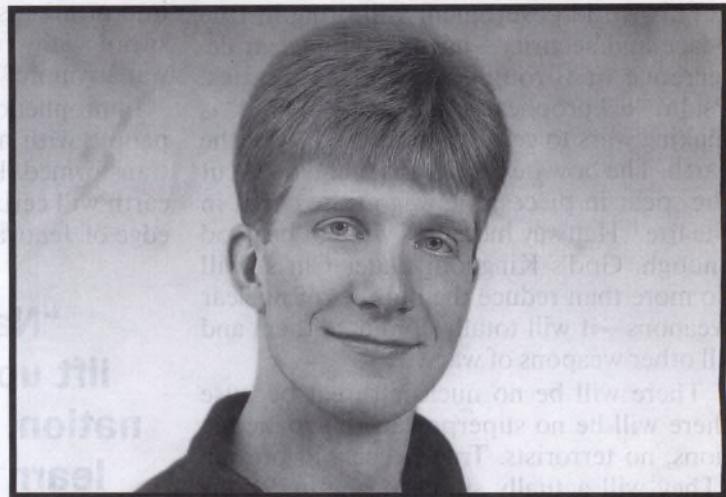
actually reside for a while with the male lamb, and with the kid the leopard itself will lie down, and the calf and the maned young lion and the well-fed animal all together; and a mere little boy will be leader over them. . . . They will not do any harm or cause any ruin in all my holy mountain."—Isaiah 11:6-9.

Belief in these divine promises has given Jehovah's Witnesses an optimistic outlook on life. When we look to the future, we do not envision an earth ravaged by nuclear devastation. Rather, we see the fulfillment of the Bible promise: "The righteous themselves will possess the earth, and they will reside forever upon it." (Psalm 37:29) Some would call such faith naive and unrealistic. But who really is naive? One who puts faith in the promise of God or one who swallows the empty promises of politicians? To real lovers of peace, the answer is obvious.\*

\* Jehovah's Witnesses have helped millions to embrace the Bible's message of hope by means of a free home Bible study. You can arrange to have them visit you by contacting the publishers of this magazine or by visiting the local Kingdom Hall of Jehovah's Witnesses.

## YOUNG PEOPLE ASK . . .

**"It's total imagination. One time you're a magician. Another time you're a warrior. You can become loads of characters that you dream of being. There are no limits."**—Christophe.



**B**E ALL that you can't be." One magazine quoted this slogan when describing a popular fantasy game. For millions of youths, escaping into the fantasy world of role-playing games has enormous appeal. What exactly, though, are role-playing games?

According to the book *Jeux de rôle* (Role-Playing Games), "each player embodies a legendary character on a mission or quest and prepares to experience an adventure in an imaginary world." The object of the game is to develop this assumed character by acquiring the experience, money, weapons, or magic powers needed to accomplish the mission.

Role-playing games became popular in the 1970's with the game Dungeons and Dragons.\* Since then, they have developed into a multimillion-dollar industry, embracing board games, trading cards, interactive books, computer games, and even live-action games in which participants act out adventures. Apparently, there are more than six million regular players in the United States and hundreds of thousands in Europe. In France many high schools have clubs for

### Is There Any Danger in Role-Playing Games?

role-playing games, while in Japan they are the most popular type of video games.

Advocates claim that these games stimulate the imagination, develop problem-solving skills, and promote group interaction. Opponents, though, have linked these games to suicides, murders, rapes, graveyard desecrations, and Satanism. In Madrid, Spain, two youths were arrested, under suspicion of killing a 52-year-old man while playing out the scenario of a role-playing game. In Japan a teenager killed his parents and slit his wrists as the finale to a similar game. True, these are exceptions—most players are intelligent and sociable. Still, young Christians do well to ask, 'Are role-playing games for me? Is there any need for caution?'

#### Violence and the Occult

Role-playing games differ widely, varying in both form and content. Even so, violence

\* See *Awake!* of March 22, 1982, pages 26-7.

is present in many, if not most, of these games. In fact, in the imaginary universes that these games create, violence is often an integral part of advancement—or survival. How, then, would playing such games harmonize with Bible counsel? Proverbs 3:31 says: “Do not envy the man of violence, never model your conduct on his.” (*New Jerusalem Bible*) The Bible also urges us to ‘seek and pursue peace’—not violence.—1 Peter 3:11.

Another concern is that magic often figures prominently in these games. Often-times, players can become sorcerers or other personalities with magic powers. Obstacles or enemies are then overcome through occult means. Reportedly, one popular game "allows players to take the role of either Angels or Demons in the service of Archangels or Demon Princes . . . Sacrilegious overtones keep it amusing." One computerized game even allows a player to become all-powerful simply by typing the word "Satan."

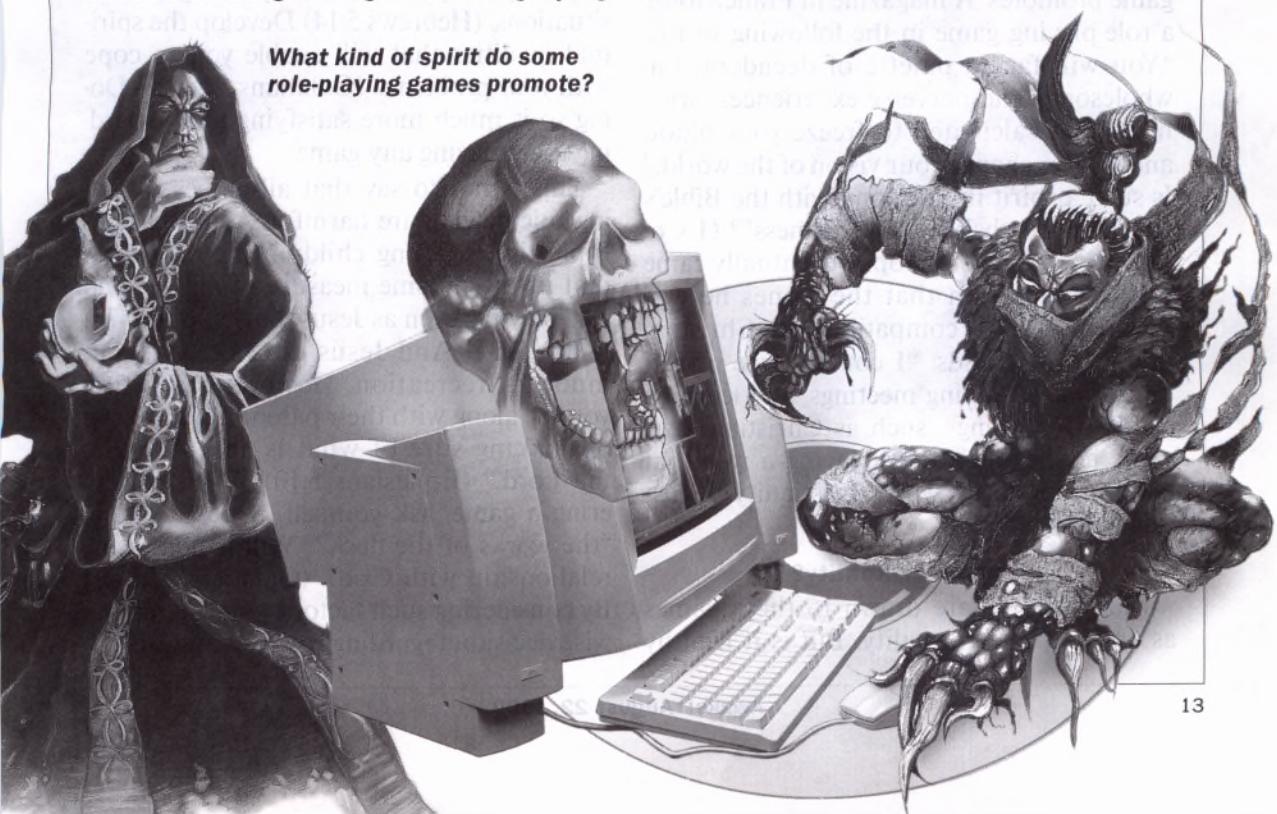
Some Christian youths have reasoned that there is nothing wrong with role-playing

games as long as a person doesn't spend too much time playing them. "It's just a game," one youth says. Maybe. But God warned the Israelites against involvement with the occult. The Law given to Moses declared that "anyone who employs divination, a practitioner of magic or anyone who looks for omens or a sorcerer, or one who binds others with a spell or anyone who consults a spirit medium or a professional foreteller of events . . . is something detestable to Jehovah."—Deuteronomy 18:10-12.

Is it wise, then, to play any game that promotes the occult? Could not acting out roles of those with magic powers amount to delving into "the 'deep things of Satan'"? (Revelation 2:24) One youth admits: "After I played a role-playing game all day long, I was afraid to leave the house. I felt that I would be attacked by someone." Could anything that generates such paralyzing fear be healthy?

## **Other Factors**

"The time left is reduced," says 1 Corinthians 7:29. So another major concern is the



commitment of time that role-playing games often require. Some games take hours, days, or even weeks to play. What is more, the role can be so engrossing, even addictive, that everything else becomes secondary. "As I cleared each stage," admits one youth, "I wanted harder challenges and more realism. I got really hooked." How might such addiction affect a youth's schoolwork and spiritual activities?—Ephesians 5:15-17.

A youth from Japan recalls: "I was always thinking about what to do next in the game, even when I was not playing. At school and at meetings, all I could think about was the game. It got to the point where I couldn't think about anything else. My spirituality was in shreds." Christophe, mentioned at the outset, says that he was "out of sync with the real world." True, there is 'a time to laugh and a time to skip about,' but should recreation be allowed to crowd out spiritual activities?—Ecclesiastes 3:4.

Think, too, about what kind of spirit the game promotes. A magazine in France touts a role-playing game in the following words: "You will face a palette of decadent, unwholesome, and perverse experiences, organized and calculated to freeze your blood and forever change your vision of the world." Is such a spirit in harmony with the Bible's advice to be "babes as to badness"? (1 Corinthians 14:20) Christophe eventually came to the conclusion that the games he was playing were "not compatible with Christian morality." He adds: "I couldn't see myself preaching, attending meetings, and learning about good things, such as Christian love, while at the same time playing a role that had nothing to do with Christianity. It just wasn't logical."

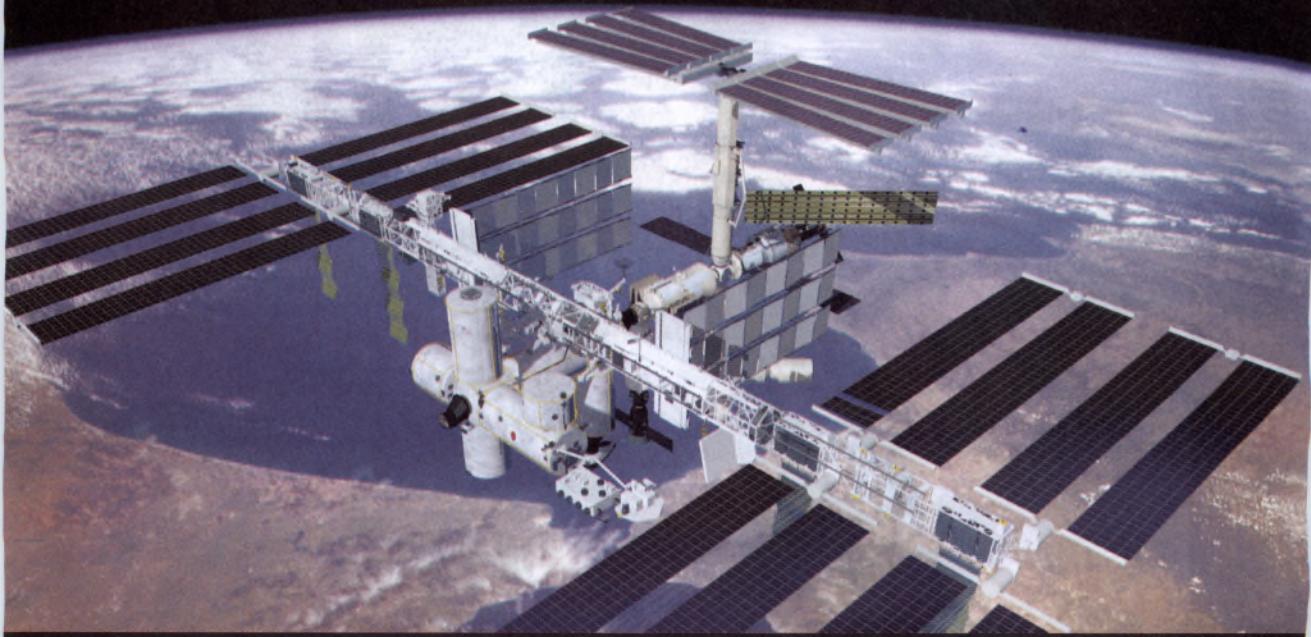
### Illusion or Reality?

Many youths are drawn to these games as an escape from reality. But is it healthy

to immerse oneself in a world of fantasy? French sociologist Laurent Trémel comments: "The real universe, dominated by uncertainty about the future, . . . contrasts terribly with these virtual but very realistic universes, where you finally master the rules and where you can model a character to resemble either what you are or what you would like to be." Mental-health expert Etty Buzyn further observes: "In playing, youths have the impression that they are leading a dangerous life, remaking the world, but in reality, they are not measuring up to any real risk. They are fleeing from society and its limits."

Ultimately, such escapism can only lead to frustration, since the realities of life lie just beyond the end of the game. These realities must eventually be confronted. Really, no amount of success or adventure in an imaginary role will ever make up for failure or mediocrity in real life. The smart thing to do is to confront life's realities—head-on! Sharpen your perceptive powers by facing real-life situations. (Hebrews 5:14) Develop the spiritual qualities that will enable you to cope with your problems. (Galatians 5:22, 23) Doing so is much more satisfying and rewarding than playing any game.

This is not to say that all games involving role-playing are harmful. As far back as Bible times, young children played games that involved some measure of fantasy and role-playing, even as Jesus himself observed. (Luke 7:32) And Jesus did not condemn innocent recreation. However, Christian youths, along with their parents, must "keep on making sure of what is acceptable to the Lord." (Ephesians 5:10) When considering a game, ask yourself, 'Does it reflect "the works of the flesh"? Will it hinder my relationship with God?' (Galatians 5:19-21) By considering such factors, you can make a wise decision regarding role-playing games.



# THE INTERNATIONAL SPACE STATION AN ORBITING LABORATORY

In a couple of years, when you gaze into a clear night sky, you may see not only the stars and the moon but also an artificial "star," an object shining as brightly as the planets. The size of two football fields, this man-made colossus, which is already under construction, has been called 'the biggest engineering project since the pyramids.' What is it?

When it is completed, it will be the International Space Station (ISS)—a permanent space research laboratory created by more than 100,000 workers. Most of these are working in Canada, Russia, and the United States, but many others are in Belgium, Brazil, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom. The completed ISS will be 290 feet long and 356 feet wide, with as much work and living space as the cabins of two Boeing 747 jets. The space station will eventually weigh 520 tons, and its construction will cost at least \$50 billion!

Some critics who worry about such enormous costs in the name of research call the ISS "an interstellar

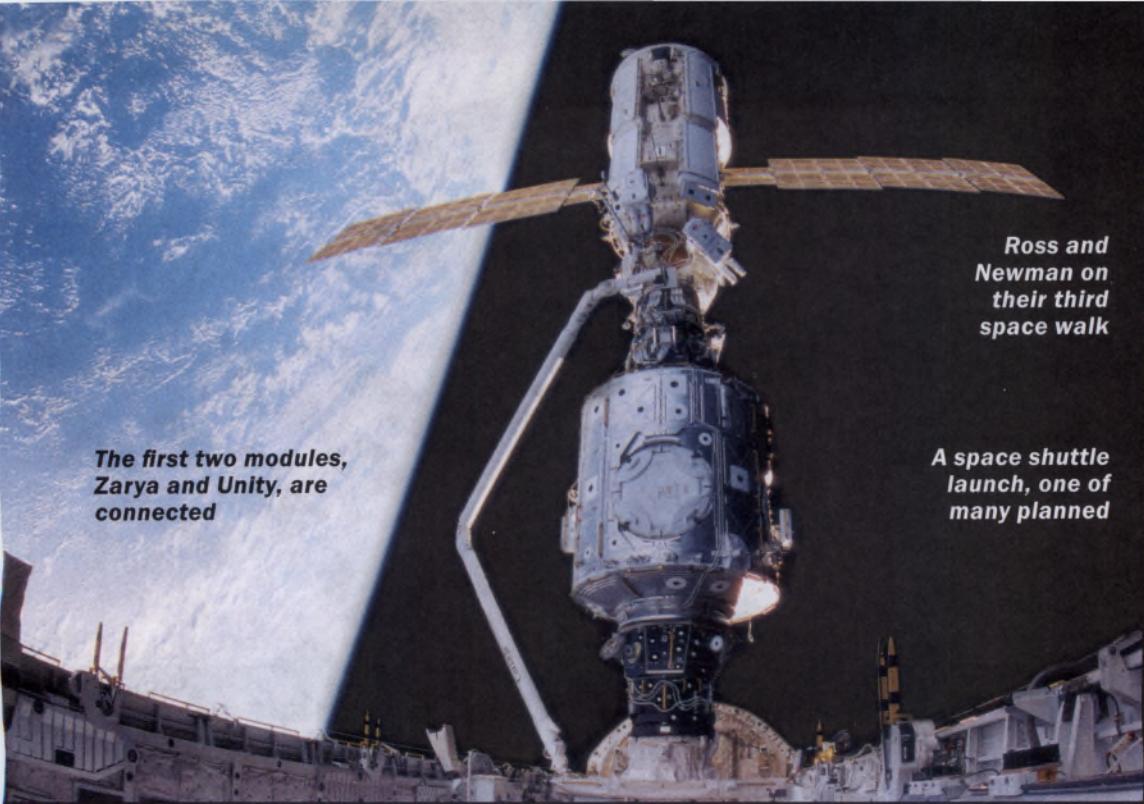
white elephant." On the other hand, its proponents expect the space station to provide a test site for new, advanced industrial materials, communications technology, and medical research. However, before astronauts can strap lab equipment to the walls of the ISS, it must be put together piece by piece, and all of this must be done in space!

## Building It In Space

Because of its colossal size, the ISS could not be assembled on earth, since it would collapse under its own weight. To overcome this hurdle, scientists are building modules on earth that will be joined in space to form the space station. It will take 45 launches by Russian boosters and U.S. space shuttles to deliver these components into space.

Assembling the station is an unprecedented task, turning space into an ever-changing construction site! More than 100 modules will be joined while the workers and materials are in orbit. The international crew of astronauts must do much of the work by hand, performing many hundreds of hours of space walks.

Above: Artist's conception of completed station in 2004



Ross and Newman on their third space walk



A space shuttle launch, one of many planned



The first module of the ISS—the 20-ton, Russian-built Zarya (meaning "Sunrise")—blasted off on November 20, 1998, from the Baykonur Cosmodrome, in Kazakhstan. This module needed enough fuel to keep it and the other modules being added to it in orbit. Two weeks after Zarya blasted off, the space shuttle Endeavour carried aloft the American-built connecting module named Unity.

During that first construction session in space in December 1998, the Endeavour crew got a taste of the challenges ahead. During the rendezvous with Zarya 250 miles above the earth, astronaut Nancy Currie used a 50-foot robotic arm to grab that 20-ton module and clamp it onto Unity. Then, astronauts Jerry Ross and James Newman attached electrical and computer wires and fluid hoses outside the two modules. These connections are used to send power between the modules and to allow water to circulate for cooling the air and for drinking. It took three space walks, of more than 21 hours in all, to complete these tasks.

As rockets and shuttles deliver new modules every few weeks, the ISS will grow from the single Russian module Zarya to a 520-ton space station. Keeping that growing station in orbit will be a challenge, since

it must resist the tug of earth's gravity. So it is in constant danger of falling back to earth. To keep the station aloft, space shuttles will visit it and give the space station a boost to maintain its proper altitude.

The near-zero gravity will play an important role in the research conducted on the ISS, where gravitational force equals only one millionth of the strength of that force exercised on earth. A pencil dropped on earth would fall six feet in 0.5 seconds. On the space station, it would take ten minutes! How will the ISS serve as a laboratory, and how can this affect your daily life?

#### Orbiting Laboratory

The ISS is expected to be completed by 2004. Afterward, up to seven astronauts at a time will call the giant complex home. Some will live there for several months. On board this so-called window to the universe, the ISS crew will perform a diverse array of experiments designed by scientists from around the world.

For example, when the force of gravity is very weak, plant roots do not push down and leaves do not reach up. So scientists plan experiments to learn how plants

## DATES CONNECTED WITH SPACE STATIONS

**1869:** American Edward Everett Hale publishes a short story, *The Brick Moon*, about a manned brick space satellite above the earth.

**1923:** Romanian-born Hermann Oberth coins the term "space station." He has in mind a starting point for flights to the Moon and to Mars.

**1929:** In his book *The Problem of Space Travel*, Hermann Potocnik outlines a plan for a space station.



**1950's:** Rocket engineer Werner von Braun describes a wheel-shaped station orbiting 1,075 miles above earth.

**1971:** The Soviet Union launches Salyut 1, the first space station in history. Three cosmonauts stay in the station for 23 days.

**1973:** *Skylab*, the first U.S. space station, is put into orbit and accommodates three teams of astronauts. This station is no longer in space.

**1986:** The Soviets launch *Mir*, the first space station designed to maintain a permanent human presence in space.

**1993:** The United States invites Russia, Japan, and other nations to join in developing the International Space Station (ISS).

**1998/99:** The first modules of the ISS are launched into orbit —one year behind schedule.

behave in the absence of gravity. In addition, protein crystals grow bigger and become more symmetrical in space. Thus, purer crystals might be produced under such conditions. Information about this may help researchers develop medicines that target particular disease-causing proteins. In an environment where gravity is very weak, it may be possible to produce materials that are almost impossible to make on earth.

In near-zero gravity human bones and muscles deteriorate. Former astronaut Michael Clifford observed: "Part of the scientific research is aimed toward understanding the physiological effects of long-term exposure to space." At least one experiment will be made to determine how bone loss might be combated.

Learning the long-term effects of living in space could perhaps help to make a long duration space-flight to Mars possible someday. "That's a fairly long trip," Clifford acknowledged. "We want to have the capability of bringing [the space explorers] back in good shape."

Additionally, supporters of the ISS predict that research on the space station will lead to a better understanding of the fundamental building blocks of life. Such an understanding could possibly result in new methods for treating cancer, diabetes, emphysema, and immune-system disorders. The laboratories on board the ISS will boast a bioreactor that grows cell

cultures resembling natural tissue. Scientists will be seeking to learn more about human diseases and how to treat them successfully. Also aboard will be a 20-inch optical window to study atmospheric gases, coral-reef bleaching, hurricanes, and other natural phenomena on earth.

### A "Laboratory for Peace"?

Nevertheless, for some of its fervent promoters, the ISS is more than just a floating laboratory. They see it as fulfilling a promise from the Apollo Program, which left a plaque on the moon that said: "We came in peace for all mankind." After describing the ISS as a "laboratory for peace," septuagenarian astronaut John Glenn added: "[It] will let 16 nations all work together in space instead of figuring out ways to do things to each other on Earth that aren't good." He and others see the ISS as a place where nations can learn to cooperate on science and technology projects that none can afford individually but from which all will benefit.

Many, however, cannot help but wonder whether nations will really cooperate peacefully in space, since they are unable to do so on earth. At any rate, the ISS is the result of man's drive to step into the unknown and learn what happens under the conditions that exist there. Indeed, this mammoth project is a product of man's sense of adventure and his passion for discovery.

Pages 15-17: NASA photos



# Serving God in the Face of Death

AS TOLD BY JOÃO MANCOCA

*On June 25, 1961, soldiers broke up our Christian meeting in Luanda, Angola. Thirty of us were taken to prison and beaten so viciously that the soldiers returned every half hour to see if anyone was dead. Some of them were heard to remark that our God must be true, since we all survived.*

AFTER that beating I remained in the São Paulo prison for five months. Then, for the next nine years, I was transferred from one prison to another and suffered many more beatings, deprivations, and interrogations. Shortly after my release from confinement in 1970, I was arrested again, and this time I was sent to the infamous death camp of São Nicolau, now Benitiaba. I was held there for two and a half years.

You may wonder why as a law-abiding citizen, I would be imprisoned for speaking to others regarding my Bible-based beliefs and where I first learned about the good news of God's Kingdom.

## Blessed With a Good Education

I was born in October 1925 near the town of Maquela do Zombo, in the north of Angola. When Father died in 1932, Mother sent me to live with her brother in the Belgian Congo (now Democratic Republic of Congo). It was not what she really wanted to do, but she had no means to provide for me.

My uncle was a Baptist, and he encouraged me to read the Bible. Although I became a member of his church, my spiritual

hunger was not satisfied by what I learned, nor was I motivated to serve God. My uncle, however, sent me to school and helped me to get a good education. Among other things, I learned to speak French. In time, I also learned to speak Portuguese. After leaving school, I got a job as a radio telegraphist at the central radio station in Léopoldville (now Kinshasa). Then, when I was 20, I married Maria Pova.

## A New Religious Movement

That same year, 1946, I came under the influence of a well-educated Angolan choir conductor who belonged to the Baptist Church. He was eager to educate and uplift the Kikongo-speaking people who live in the north of Angola. He had acquired a Portuguese translation of the English booklet *The Kingdom, the Hope of the World*, which was published by the Watch Tower Bible and Tract Society and distributed by Jehovah's Witnesses.

The choir conductor translated this booklet into Kikongo and used it to conduct a weekly Bible discussion with a group of us Angolans who were working in the Belgian Congo. In time, the choir conductor wrote to the headquarters of the Watch Tower Society in the United States and acquired more literature. However, the information he conveyed to us was mixed with the teachings of the churches. Thus, I wasn't able to differentiate clearly between true Christianity and the unscriptural teachings of Christendom.

I did notice, however, that the Bible message contained in the Watch Tower Society's literature was different from anything that

I had ever heard in the Baptist Church. For example, I learned that the Bible places great importance on God's personal name, Jehovah, and that true Christians appropriately call themselves Jehovah's Witnesses. (Psalm 83:18; Isaiah 43:10-12) Further, my heart was warmed by the Bible's promise of everlasting life on a paradise earth for those who would faithfully serve Jehovah.—Psalm 37:29; Revelation 21:3-5.

Although my knowledge of Bible truth was limited, I felt like the prophet Jeremiah, who could not contain his burning desire to speak about his God, Jehovah. (Jeremiah 20:9) Members of our Bible study group joined me in preaching from house to house. I even held public meetings in my uncle's yard, using typed invitations to invite people. As many as 78 persons at a time attended. Thus a new religious movement was formed under the leadership of the Angolan choir conductor.

### **My First Imprisonments**

Unknown to me, any movement that had a connection with the Watch Tower Society was forbidden in the Belgian Congo. Thus, on October 22, 1949, a few of us were arrested. Before our trial, the judge spoke privately to me and tried to arrange to set me free, since he knew that I was a state employee. But to gain my freedom, I would have had to renounce the movement that had formed as a result of our preaching, and this I refused to do.

After two and a half months in prison, the authorities decided to send those of us who were Angolans back to our own country. When we returned to Angola, however, the Portuguese colonial authorities were also suspicious of our activities and curtailed our freedom. More members of our movement arrived from the Belgian Congo, and eventually there were over 1,000 of us scattered throughout Angola.

In time, followers of the prominent religious leader Simon Kimbangu were included in our movement. These people were not interested in studying the literature of the Watch Tower Society, since they believed that the Bible could only be explained by a spirit medium. The majority in our movement supported such a view, including the choir conductor, who was still considered our leader. I prayed fervently that Jehovah would bring us into contact with a true representative of the Watch Tower Society. I hoped that this would convince our entire movement to accept Bible truth and to reject unscriptural practices.

Certain members of the movement resented the preaching that a few of us were doing. So they betrayed us to the authorities and accused us of being the leaders of a political movement. As a result, in February 1952 a number of us were arrested, including Carlos Agostinho Cadi and Sala Ramos Filemon. We were locked in a cell without windows. However, a friendly guard brought food from our wives as well as a typewriter so that we could make more copies of the Watch Tower Society's booklets.

After three weeks we were deported to Baia dos Tigres, a desert region in the south of Angola. Our wives accompanied us there. We were sentenced to four years' hard labor, working for a fishing company. Baia dos Tigres had no harbor for the fishing boats, so

### **IN OUR NEXT ISSUE**

**Unraveling the Mystery  
of Your Genes**

**What Does It Take  
to Keep Them Flying?**

**The Pantanal  
—A Fascinating Sanctuary**

our wives had to wade back and forth from morning till night carrying heavy loads of fish from the boats.

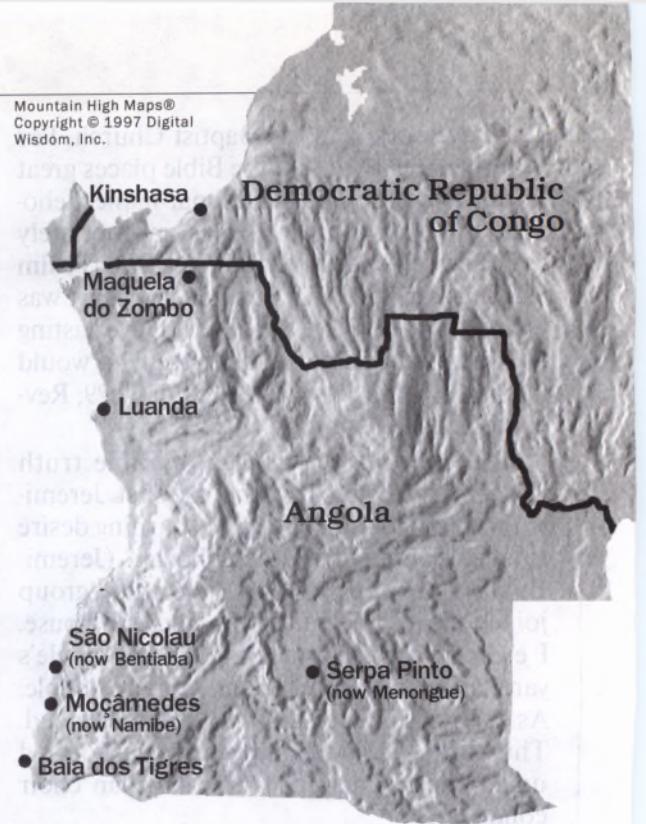
In this prison camp, we found other members of our movement and tried to persuade them to continue studying the Bible. But they preferred to follow Toco, the choir conductor. In time, they came to be called Tocoists.

#### A Long-Awaited Meeting

While in Baia dos Tigres, we discovered the address of the Northern Rhodesia (now Zambia) branch of the Watch Tower Society and wrote requesting help. Our letter was passed on to the South Africa branch, which corresponded with us, asking how we became interested in Bible truth. The headquarters of the Watch Tower Society, in the United States, was informed about us, and arrangements were made to send a special representative to contact us. He was John Cooke, a missionary with many years of experience in foreign lands.

After Brother Cooke arrived in Angola, it took him a number of weeks before the Portuguese authorities would permit him to visit us. He arrived at Baia dos Tigres on March 21, 1955, and was permitted to stay with us for five days. His explanations of the Bible were very satisfying, and I was convinced that he represented the only true organization of Jehovah God. On the last day of his visit, Brother Cooke gave a public talk on the subject "This Good News of the Kingdom." A total of 82 were present, including the chief administrator of Baia dos Tigres. Each one in attendance received a printed copy of the talk.

During his five-month stay in Angola, Brother Cooke made contact with a number of Tocoists, including their leader. However, the majority of them were not interested in becoming Jehovah's Witnesses. Thus, my companions and I felt obligated to make



our stand clear to the authorities. We did this in a formal letter, dated June 6, 1956, and addressed to "His Excellency the Governor of the District of Moçâmedes." We stated that we no longer had any connection with the followers of Toco and that we should be viewed as "members of the Society of Jehovah's Witnesses." We also requested that we be granted freedom of worship. Yet, instead of our sentence being reduced, it was extended two years.

#### Events Leading to Baptism

We were finally set free in August 1958, and on returning to Luanda, we found a small group of Jehovah's Witnesses. It had been organized the year before by Mervyn Passlow, a missionary who was sent to Angola to replace John Cooke but who had already been deported by the time we arrived. Then, in 1959, Harry Arnott, another missionary of Jehovah's Witnesses, visited. However, he was arrested upon disembarking at the air-

port, as were the three of us waiting to meet him.

The two others, Manuel Gonçalves and Berta Teixeira, recently baptized Portuguese Witnesses, were released after being warned not to hold any more meetings. Brother Arnot was deported, and I was warned that unless I signed a paper declaring that I was no longer a Witness, I would be sent back to Baia dos Tigres. After seven hours of interrogation, I was released without having signed anything. A week later I was finally able to be baptized, as were my friends Carlos Cadi and Sala Filemon. We rented a room in Muceque Sambizanga, a suburb of Luanda, which came to be the location of the first congregation of Jehovah's Witnesses in Angola.

### **Renewed Persecution**

A growing number of interested people began to attend the meetings. Some came to spy on us, but they enjoyed the meetings and later became Jehovah's Witnesses! The political scene was changing, and the situation became more difficult for us after a nationalist uprising on February 4, 1961. Despite the falsehoods that circulated about us, on March 30 we succeeded in celebrating the Memorial of Christ's death, with an attendance of 130.

In June, while I was conducting the *Watchtower Study*, our meeting was broken up by the military police. The women and children were released, but the 30 men there were taken away, as noted in the introduction. We were beaten continuously for two hours with wooden clubs. For three months afterward, I vomited blood. I was certain that I would die; in fact, the one who had beaten me promised that I would. Most of the others who were beaten were new, unbaptized Bible students, so I prayed earnestly in their behalf: "Jehovah, take care of your sheep."

Thanks to Jehovah, none of them died, which amazed the military personnel. Some of these soldiers were moved to praise our

God, who they said had enabled us to survive! Most of the Bible students eventually became baptized Witnesses, and some now serve as Christian elders. One of them, Silvestre Simão, is a member of the Angola Branch Committee.

### **Nine Years of Suffering**

As I mentioned at the outset, I suffered in many ways during the next nine years and was transferred from one prison or labor camp to another. In all these places, I was able to witness to political prisoners, many of whom are baptized Witnesses today. My wife, Maria, and our children were allowed to accompany me.

While we were at the Serpa Pinto labor camp, four political prisoners were caught trying to escape. They were cruelly tortured to death in front of all the prisoners to scare them into not even thinking of escaping. The camp commander later threatened me in front of Maria and the children: "If I catch you preaching again, you will be killed in the same manner as those who tried to escape."

Finally, in November 1966, we ended up at what had become the terrible death camp of São Nicolau. When we arrived there, I was horrified to find out that the camp administrator was Mr. Cid, the man who had practically beaten me to death at the São Paulo prison! Dozens were systematically murdered every month, and my family was forced to watch the brutal killings. As a result, Maria suffered a nervous breakdown from which she has never fully recovered. Eventually, I was able to get permission for her and the children to be evacuated to Luanda, where my two older daughters, Teresa and Joana, took care of them.

### **Freedom, but Imprisoned Again**

I was released the following year, in September 1970, and was reunited with my family and all the brothers in Luanda. It brought tears to my eyes to see how the preaching

work had progressed during the nine years of my absence. When I was taken away to prison in 1961, the congregation in Luanda consisted of four small groups. Now there were four large congregations, properly organized and assisted every six months by a traveling representative of Jehovah's organization. I was overjoyed to be free, but my freedom was short-lived.

One day the director general for the now extinct Police for Investigation and Defense of the State (PIDE) called me. After flattering me in the presence of my daughter Joana, he handed me a document to sign. It enlisted my services as an informer for PIDE and promised me many material rewards for my services. When I refused to sign, I was threatened with being returned to São Nicolau, from where, I was told, I would never be freed again.

In January 1971, after only four months of freedom, those threats were acted on. Altogether, 37 Christian elders from Luanda were arrested and sent to São Nicolau. There we were incarcerated until August 1973.

#### **Released, yet Still Persecuted**

In 1974 religious freedom was proclaimed in Portugal, and afterward this freedom was extended to the Portuguese overseas provinces. On November 11, 1975, Angola gained independence from Portugal. What a thrill it was for us in March of that same year to experience our first circuit assemblies in freedom! I had the privilege of giving the public talk for these joyous gatherings at the Sports Citadel in Luanda.

The new government, however, opposed our neutral stand, and civil war raged throughout Angola. The situation became so critical that the white Witnesses were forced to flee the country. Three of us local brothers were put in charge of the preaching work in Angola, under the direction of the Portugal branch of Jehovah's Witnesses.

Soon my name began to appear in newspapers and was broadcast over the radio. I was accused of being an agent of international imperialism and of being responsible for Angolan Witnesses' refusing to take up arms. As a result, I was summoned to appear before the first governor of the province of Luanda. Respectfully, I explained to him the neutral stand of Jehovah's Witnesses worldwide, which is the position that was taken by the early followers of Jesus Christ. (Isaiah 2:4; Matthew 26:52) When I pointed out that I had spent over 17 years in prisons and labor camps during colonial rule, he decided not to arrest me.

During those days, it took courage to serve as a Witness for Jehovah in Angola. Since my home was being watched, we had to quit using it for meetings. But as the apostle Paul said, 'we were pressed in every way, but not cramped beyond movement.' (2 Corinthians 4:8) Never did we become inactive in our ministry. I continued in the preaching work, serving as a traveling minister and strengthening the congregations in the provinces of Benguela, Huila, and Huambo. At that time I went by another name, Brother Filemon.

In March 1978 our preaching work was again banned, and I was informed by reliable

**Below: With John Cooke In 1955.  
Sala Filemon is on the left**

**Right: Reunion with John Cooke  
after 42 years**



sources that revolutionary fanatics planned to kill me. So I took refuge in the home of a Witness from Nigeria who was an employee of the Nigerian embassy in Angola. A month later, when the situation had quieted down, I continued serving the brothers as a circuit overseer.

Despite the ban and the civil war, thousands of Angolans responded to our preaching. Because of the fine growth in the number becoming Witnesses, a country committee was appointed to care for the preaching work in Angola, under the direction of the Portugal branch. During this time, I traveled on a number of occasions to Portugal, where I received valuable training from qualified ministers, as well as needed medical care.

### **At Last, Freedom to Preach!**

When I was in labor camps, political prisoners would often mock me and say that I would never be set free if I continued to preach. But I would reply: "It is



***With my wife, Maria***

not yet the time for Jehovah to open the door, but when he does, no man will be able to shut it." (1 Corinthians 16:9; Revelation 3:8) That door of opportunity to preach without restrictions was opened wider after the collapse of the Soviet Union in 1991. At that time we began to experience more freedom of worship in Angola. In 1992 the work of Jehovah's Witnesses was officially legalized. Finally, in 1996 a branch of Jehovah's Witnesses was established in Angola, and I was appointed as a member of the Branch Committee.

During my many years of imprisonment, somehow my family was always cared for. We had six children, and five of these are still living. Our beloved Joana died last year of cancer. Four of our remaining children are baptized Witnesses, but our other child has not yet taken the step of baptism.

When Brother Cooke visited us in 1955, we had a total of four Angolans declaring the good news of God's Kingdom. Today there are over 38,000 Kingdom proclaimers in the country, and they are conducting over 67,000 Bible studies every month. Among those preaching the good news are many who formerly persecuted us. How rewarding this is, and how thankful I am to Jehovah for preserving me and allowing me to fulfill my burning desire to declare his word!—Isaiah 43:12; Matthew 24:14.



# They Are Determined Not to Give Up

THE October 22, 1998, *Awake!* had a short article about 17-year-old Matt Tapio's long battle against cancer. It was entitled "He Did Not Give Up." Matt eventually died on April 19, 1998, while the article was being prepared.

The article quoted what Matt said in a recorded interview that was played at a meeting of Jehovah's Witnesses, and this proved particularly moving to young readers. Here are some of their sentiments.

**Deseree**, a 20-year-old from Canada, wrote of the impact it had when she and her partner in the full-time ministry read how much Matt loved Jehovah: "We burst into tears. We proceeded to weep for quite a while. . . . How all of us,

especially young people, can learn from Matt to 'do what you can now! . . . Whatever happens, don't ever stop witnessing about Jehovah!'"

**Erin**, from Kentucky, U.S.A., wrote: "I couldn't help but cry as I read his experience. Being a healthy 16-year-old girl, I want to do as much as possible for Jehovah while I can, so that one day, when he is resurrected, I may personally tell Matt how much his experience encouraged me." Similarly, **Maria**, a 15-year-old from Texas, U.S.A., explained: "I am determined to do all I can for Jehovah while I still have my health. Matt's advice has been very helpful."

**Jessica**, a youth from South Carolina, U.S.A., wrote: "I'm 13 years old, and I personally found it extremely encourag-

ing to see another youth full of so much zeal and love for Jehovah. Just reading about Matt Tapio's condition made me realize how blessed I am to be healthy. I've added Matt's name to my list of brothers and sisters I plan to greet in the new system!"

**Sara**, from San Severino Marche, Italy, wrote: "The article moved me to tears. I am 17, the same age as Matt. Since I am in good health, my desire is that I never stop speaking about Jehovah, just as Matt never did, even during the most difficult moments of his life. Thank you for publishing experiences like this, which motivate us to give the very best of our lives, of our time, and of our energies to Jehovah.—Ecclesiastes 12:1."

**Deseree**



**Erin**



**Maria**



**Jessica**



## **Sustained by the Resurrection Hope**

Whether one is young or old, it is common today to face the reality of death. A 19-year-old named **Heidi** observed: "In the last two weeks, I have lost two people close to me in death, and the only thing that has kept me going is the hope of seeing them in the resurrection.

"I am very proud of Matt and his firm resolve to keep witnessing to others despite being so sick. He is a true example for all, and I look forward to giving him a hug in the resurrection."

A mother named **Nancy** wrote: "I read the article amid my tears. Our daughter Rachelle passed away from a brain-stem tumor on January 11, 1996, just two days before Matt realized his goal of getting baptized. Rachelle was only six years of age when the tumor took her life, but like Matt, she was a fighter, and she always tried her best to please Jehovah.

**Sara**



**Heidi**



"It will be a glorious day when Jehovah will give us the blessing of seeing our daughter healthy and able to enjoy her childhood to the fullest. Like Jairus and his wife, we will be beside ourselves 'with great ecstasy.'”—Mark 5:42.

**Shannon**, from Georgia, U.S.A., wrote: "This story showed me that you can be strong for Jehovah even if you are sick. Even though I don't have a major sickness now and have always had good health, I will save this to read later on.

"I hope that Matt's parents will find comfort in the resurrection hope. I too lost someone very close to me in death—my grandmother, in 1995. I'm so thankful that I know Jehovah and that I have the hope of seeing my loved ones again."

A Spanish teenager wrote: "My parents instilled in my four sisters and me the value of attending Christian meetings. But after reading this experience, I realize that we could come to view them as

routine. I would like to congratulate Matt's parents on giving him such a good spiritual education. They are an example for all of us. I would like them to know that although it is difficult to cope with this kind of emptiness, Jehovah is always by our side.

"I hope to meet Matt in the new world. I would like to say to him that he is a great example and that we all remember him in our hearts. Jehovah is a God of the living, and Matt is now in the same place as my sister who died four years ago—in Jehovah's memory. (Luke 20:38) Matt, my sister Eva, and many other faithful servants of God are present there. Jehovah is wonderful, and he will never leave us."

Truly, the hope of the resurrection is marvelous. May we treasure it, and may we show our appreciation for this grand promise by remembering our Creator daily, even as his dear Son, Jesus Christ, did.

**Nancy, with her husband and daughter Rachelle**



**Shannon**



# PEANUT BUTTER AFRICAN STYLE

BY AWAKE! CORRESPONDENT IN  
**CENTRAL AFRICAN REPUBLIC**

**I**N Western lands peanut butter is often thought of as little more than something to spread on a slice of bread. In some African lands, however, it actually plays a more important role in daily life. How so?

In central Africa, many popular dishes are prepared with peanut butter. Here, as in other developing areas, flour and cornstarch—ingredients used to thicken stews and sauces—are often hard to come by. Peanut butter is thus commonly used as a substitute.

However, it is not simply a matter of purchasing a jar of peanut butter at a local grocery store. There it is sold by the teaspoonful, and it is quite expensive. Many African women therefore prefer to make their own. How this laborious task is accomplished is quite fascinating. The following information was gleaned by speaking with several African women.

## Peanut Cultivation

Evidently, peanuts are not a difficult crop to care for. The hardest part is preparing the soil. This is done at the beginning of the rainy season when the ground is still dry and hard. In April the seeds are sown by hand, and if the rains come early, the "nuts" can be harvested.

**Peanuts are harvested,  
then carried home to be  
shelled and crushed**



ed by the end of August or the beginning of September.

The peanut is actually not a nut but a legume—a member of the pea family. Peanuts do not grow on trees, as you might have thought; rather, they grow on low bushes, which have a peculiar way of producing their fruit underground. Peanuts are thus commonly called groundnuts or earthnutes.

In central Africa the average field for growing peanuts may be about 300 by 150 feet. Some people have planted them on a small piece of land near their house. A short-handled hoe and a machete are commonly used to work the field. This can involve backbreaking effort! The crop requires a lot of upkeep, at least at first. The field needs to be watched so that rodents do not dig up the seeds and eat them. And the soil needs to be kept loose and free from weeds.

Especially near harvesttime does the field need watching. Children may be placed on guard as the harvest approaches. One woman reported that a neighbor found her peanut bushes high up in nearby trees. Monkeys had carried them up there and enjoyed a feast at her expense!

The harvest is usually a family affair. Everyone goes to the field to help. The plants are uprooted by hand and left to dry, and then the peanuts are broken off and brought back to the village in big bowls, which are carried on the heads of the harvesteres.

What happens to the peanuts then? After being washed, they are boiled in salty water. Some are eaten immediately by the family, but the majority are retained for later use in cooking. They are spread on the ground near the house and allowed to dry completely. Someone has to keep an eye on them to protect them from roaming goats who would like to help themselves to a snack.

After the peanuts are dried, they are

stored in a house made of grass mats and mud and built on stilts. This keeps the peanuts dry, and it also keeps away the rodents as well as children who may be looking for something to eat while Mother is still working out in the field.

#### **From Peanuts to Peanut Butter**

The nuts must be shelled before they can be made into peanut butter. Then they are roasted, usually in a wide, flat pan over a low wood fire made on the ground. This gives them their nutty flavor and makes them easier to skin. The peanuts are left to cool, and the skins are rubbed off. A grinding machine is then used to crush the roasted peanuts into a creamy butter. If no machine is available, a housewife will spread them on a large, flat stone and crush them with a bottle or a round stone.

The peanut butter will soon be put to good use as a sauce thickener, usually in a dish that is made in one pot and served with cassava, plantain, or rice. If you wonder how a dish flavored with peanut butter tastes, why not try making one?

You can follow a standard recipe and prepare a stew of meat, onions, garlic, and tomato paste. Cook it until the meat is tender, and add chopped spinach if desired. While that is cooking, stir a little water into some peanut butter to make a paste—approximately one cup for every two pounds of meat—and stir it into the stew. Let it cook for ten minutes or more on high heat so that the taste of the peanut butter will not be too strong. If the sauce is not thick enough for your liking, add some more peanut butter. Salt to taste. If you like things spicy, you can add some hot peppers.

Many find that such a dish served with rice is delicious! And while yours may not be absolutely authentic, you will have some firsthand experience with the use of peanut butter—African style!

## WATCHING THE WORLD

### The Effects of Noise

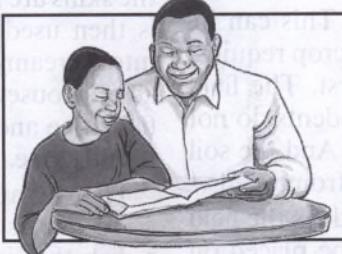
India has a population that is nearing one billion. According to Dr. S.B.S. Mann, professor at the Post Graduate Institute of Chandigarh, India, 1 person in 10, or almost one hundred million people, suffer from some sort of hearing loss. Speaking at the opening of the annual conference of the Association of Otolaryngologists of India, Dr. Mann blamed this major health problem on noise pollution caused by horns, engines, machinery, and airplanes. A large part of the blame, he said, could also be laid on the firecrackers that are so popular at festival time. During the festival of Dasehra, for instance, throughout the country huge effigies of Hindu mythological characters representing the evil forces in society are stuffed with hundreds of firecrackers and lit, creating tremendous outbursts of noise. This event is followed by the five-day Deepawali festival, during which millions of firecrackers are exploded.

### Rain Forest Fragmentation

"Hunting, deforestation, and fires are not the only threats to the survival of plants and animals," reports Brazil's *Jornal do Commercio*. Fragmentation also puts species in danger of extinction. Fragmentation occurs when small patches of forest are spared deforestation. According to Brazilian agronomist Marcelo Tabarelli, many of these fragments are less than 25 acres each. "Areas of this size do not support large mammals," says Tabarelli. For one thing, frag-

mentation "interrupts patterns of dispersion and migration." This results in "a reduction in [plant and animal] populations." Consider, for example, forest birds such as the toucan. Tabarelli notes: "They can still be found, but the probability that they will be able to hold on is very small."

### Interested Fathers Have Happier Sons



Fathers who show personal interest in their sons' worries, schoolwork, and social lives produce "motivated and optimistic young men full of confidence and hope," reports *The Times* of London. In a study of 1,500 boys aged 13 to 19 that was conducted by the Tomorrow's Men project, more than 90 percent of the boys who felt that their fathers spent time with them and took an active interest in their progress showed "high self-esteem, happiness and confidence." Conversely, 72 percent of the boys who felt that their fathers rarely or never showed interest in them had "the lowest levels of self-esteem and confidence, and were more likely to be depressed, to dislike school and to get into trouble with the police." Adrienne Katz, of the Tomorrow's Men project, observed that the actu-

al amount of time father and son spend together need not be great. She says: "It is all about making the child feel wanted, loved and listened to."

### Reading Under the Blanket

Reading in dim light under the blanket may not be good for a child's eyes, reports the German health newsletter *Apotheken Umschau*. At the University of Tübingen, a study conducted on chickens indicated that the growth of the eyeball can be affected when vision is even slightly distorted and the light is dim. When a child reads under the blanket in bed, both conditions are present: distortion, since the eye cannot focus properly when a book is held too close, and very low light. "Generations of teenagers, armed with flashlights, have devoured their favorite stories under the blanket, and by doing so they have laid the basis not only for their literary education but also for their nearsightedness," states the newsletter.

### A Comeback for Steam Locomotives?

Railroad buffs think nostalgically of the impressive steam locomotives of bygone days. Although their low efficiency and high pollution brought these classic engines to the brink of extinction, Roger Waller, an engineer with a Swiss locomotive factory, believes that steam power has a bright future. Eight of his company's steam-powered cog-rail engines are already in service in the Alps, reports the *Berliner Zeitung*, and Waller has recently reoutfitted an older

steam engine for use on standard rails. The rebuilt locomotive uses light oil as fuel instead of coal, thus reducing pollution. It also uses roller bearings to cut down on friction and good insulation to keep energy loss and heat-up time to a minimum. Says Waller: "It can run cheaper and [is] more environmentally friendly than any diesel locomotive."

### Learning to Smile

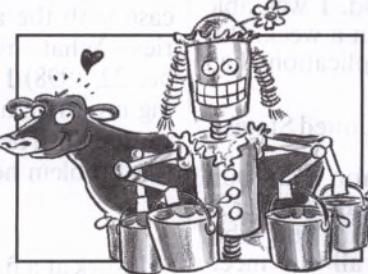
In Japan, where people take pride in good service, companies are increasingly "sending employees to schools to learn how to be more friendly," reports *Asahi Evening News*. "Companies see smiles, laughter and humor as a cheap and effective way to promote sales amid the sluggish recession." At one school, students sit in front of mirrors and practice smiling—"trying to create the most pleasant smile." They are told to think of the person they love most. Instructors endeavor to help the students relax and thus smile naturally. Besides schools, some businesses send employees to take orders in fast-food restaurants where workers are trained to smile continuously. Does smiling help business? According to the newspaper, a cosmetics company that offered smiling courses to over 3,000 of its staff saw its sales jump 20 percent during that year. One employee pointed out that the course also improved the atmosphere in her office. "It is nice being surrounded by pleasant bosses who smile a lot," she said.

### Early Detection Saves Lives

"The key to proper management and treatment of cancers is early detection," states a report in the *Times of Zambia*. Sadly, in some parts of Africa, an

unknown number of people die of cancers that could have been detected early if the individuals had received medical examinations. For women, the most common forms of the disease are cancer of the cervix and cancer of the breast. In men, it is cancer of the prostate gland and cancer of the bowel. Zambia's Central Board of Health is therefore recommending that people visit hospitals to be screened for cancer. The *Times* states that early detection "means less pain and trauma for both the patient and his or her family. In addition it enables doctors to take timely measures."

### Mechanical Milkmaid



"Milking twice per day imposes an unnatural regime on cows," says Sue Spencer, a member of a team that developed a robotic milkmaid. According to Spencer, overfull udders can induce lameness and other ailments. So, what can a dairy cow do when she wants to be milked but it's not the farmer's regular milking time? The robotic milkmaid may be the answer! It is already in use on a farm in Sweden, according to *New Scientist* magazine. Whenever they feel the need, cows in this Swedish herd can simply walk into an open barn that houses the robot. Each of the herd's 30 cows wears an electronic collar that enables the system to

identify it. If the cow is due to be milked, a gate leading to the milking stall opens. The milking machine's laser-guided mechanical arm then gently finds the cow's teats and attaches milking cups.

### Declining European Birthrate

"In the last year, the birthrate in the European Union (EU) has dropped to the lowest level since the end of World War II," reports the *Süddeutsche Zeitung*. Eurostat, the statistical agency of the EU, announced that in 1998 about four million children were born in the EU, compared with six million per year in the mid-1960's. On the average, in EU nations there are 10.7 births per 1,000 people each year. Which nation has the lowest birthrate? Italy, despite the stand of the Roman Catholic Church against birth control. It has only 9.2 births per 1,000 citizens. Ireland has the highest birthrate, with 14.1 per 1,000.

### Eating Together

In many lands, parents lament that their children seldom eat with them, often preferring fast-food meals. But France may very well be an exception. According to the French newspaper *La Croix*, a recent study revealed that 84 percent of families in France ate their evening meal together. In fact, the study found that 95 percent of 12- to 19-year-olds felt that the atmosphere of family meals was positive. Experts emphasize the importance of eating meals together regularly as a family. Notes Dr. François Baudier, of the French Center for Health Education: "The meal is not just a time to eat but especially a time to share thoughts."

## FROM OUR READERS

**Cosmic Disaster?** I am ten years old, and I enjoyed the article "The Bible's Viewpoint: Will a Cosmic Disaster Destroy Our World?" (December 8, 1998) It helped me to see that no cosmic disaster will destroy our planet because Jehovah wants us to live on a paradise earth.

J. P., United States

**Bloodless Surgery** I want to thank you for your article "Doctors Take a New Look at Bloodless Surgery." (December 8, 1998) I was quite excited about reading it, since I had great success with such treatment when I had a total hip replacement. I shared a hospital room with someone who had the very same procedure but with blood. I was able to leave the hospital in less than a week. But he had to stay, since viral complications had set in.

N. H., United States

**Quit Smoking!** The article "You Can Quit—We Did!" was special to me. (December 8, 1998) I have just finished studying the Bible with a smoker. She comes to all our meetings, but she has hit a spiritual roadblock because of her addiction. I have given her other articles on quitting smoking, but I pray that this article will finally help her to overcome her obstacle.

E. C., United States

**Chemicals and Health** I recently started a chemistry course, and when I saw the December 22, 1998, issue, it immediately captured my attention. As always, you know how to present a complicated subject in such a way that everyone can understand it. Since pollutants and chemical products recognize no borders, there would need to be international agreements in order to solve the pollution problem once and for all. But man's selfishness and greed prevent this from happening. Thankfully, Jehovah knows how to solve this problem for good.

C. V., Canada

**Loss of Parents** Thank you for writing such a wonderful article, namely, "Young People Ask . . . How Can I Survive Without My Parents?" (December 22, 1998) It helped to reassure me of Jehovah's ability to protect us young ones if we lose our parents. I have not lost my parents in death, but I often wonder what would happen to me if they died. The fine example of Horacio encouraged me greatly.

M. J., Trinidad

**Repetitive Strain** It is hard to express what you feel when you find an article that deals with a problem that you have. That was the case with the article "Repetitive Strain Injuries—What You Should Know." (December 22, 1998) I had this type of injury involving my wrist, and only now do I realize what caused it. The advice on how to deal with this problem helped me a lot.

S. T., Yugoslavia

I work at a firm that produces equipment to protect workers against repetitive strain injury (RSI). RSI has aroused curiosity and controversy, but your article was first-rate. It dealt with the subject in an unbiased and independent manner. Our board of directors was so impressed that it ordered copies to be sent to our representatives throughout Brazil.

J. P. M., Brazil

I am a housewife with an outside job that involves loading heavy wooden boxes. Right from the start, I damaged my back, arms, and wrists. About two years ago, I started stretching my muscles for ten minutes before getting up. I thought that those exercises would help, but this article gave me far more helpful methods of coping. In the future, I will give my coworkers a copy of this magazine.

K. Y., Japan

# Are Blood Transfusions Really Necessary?

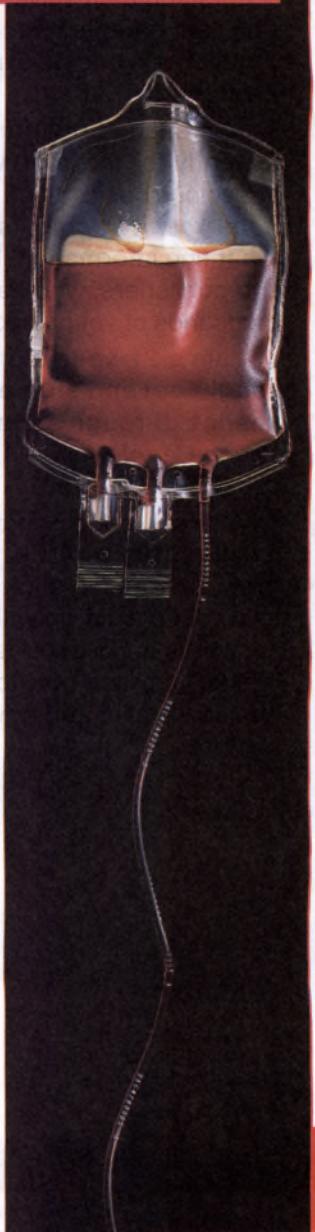
**L**AST November the above question was raised in a newspaper article written by Dr. Ciril Godec, chairman of urology at Long Island College Hospital, in Brooklyn, New York. He wrote: "Today blood would probably not be approved as a medication, since it would not fulfill safety criteria of the Food and Drug Administration. Blood is an organ of the body, and blood transfusion is nothing less than an organ transplant."

Dr. Godec observed: "Organ transplant is the very last therapeutic option offered to patients. Because of the likelihood of severe side effects, patients are thoroughly informed about all possible alternatives before a transplant is performed." Regarding blood transfusion, he concluded: "The benefit is so questionable that many surgeons have adopted a philosophy of 'transfusion avoidance' not only for medical but also for legal reasons."

A major problem with blood transfusions is that thousands of people have been infected with deadly diseases, including AIDS. Although methods of screening blood have improved in many places, Dr. Godec pointed out: "A potential danger arises from blood donated by individuals who are infected but have not yet developed antibodies that could be detected through screening tests."

Concluding his article, Dr. Godec addressed the question raised above: "As physicians and surgeons develop better understanding of the physiology of oxygen delivery and recognize that hemoglobin levels need not be as high as previously thought, it almost always becomes possible for them to find alternatives to transfusion. As recently as a year ago the demanding surgeries of heart and liver transplantation were fraught with such major blood loss that they were deemed always to require massive amounts of blood replacement. Now, both procedures have been performed without resort to transfusion.

"It is quite possible that in the very near future transfusion will be eliminated altogether.... Transfusion is not only costly and dangerous; it simply does not provide the highest quality of care that patients deserve."



# “What Fine Information!”

How can young people find a purpose in life, understand themselves, or learn to get along well with their parents? Recently, the branch office of Jehovah's Witnesses in Spain received a letter, which said in part:

“My reason for writing is to congratulate you fervently for the good work you do in publishing marvelous books, such as the one entitled *Questions Young People Ask—Answers That Work*. What fine information! I congratulate the writers and publishers, who have fulfilled the dreams of thousands of young people.

“I am a 21-year-old girl who had previously sought out and studied the Bible. . . . Quite by chance, through a friend, the book *Questions Young People Ask—Answers That Work* came into my possession.

“At first I thought that it would be of no help to me, but little by little, my interest in reading it grew. It made me think about many things, such as what I should do with my life, and gradually it answered my questions. With that treasure in my hands, I learned how to understand my parents, how to forgive, and how to be a woman and act like one.”



Questions  
**Young People Ask**  
Answers That Work



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