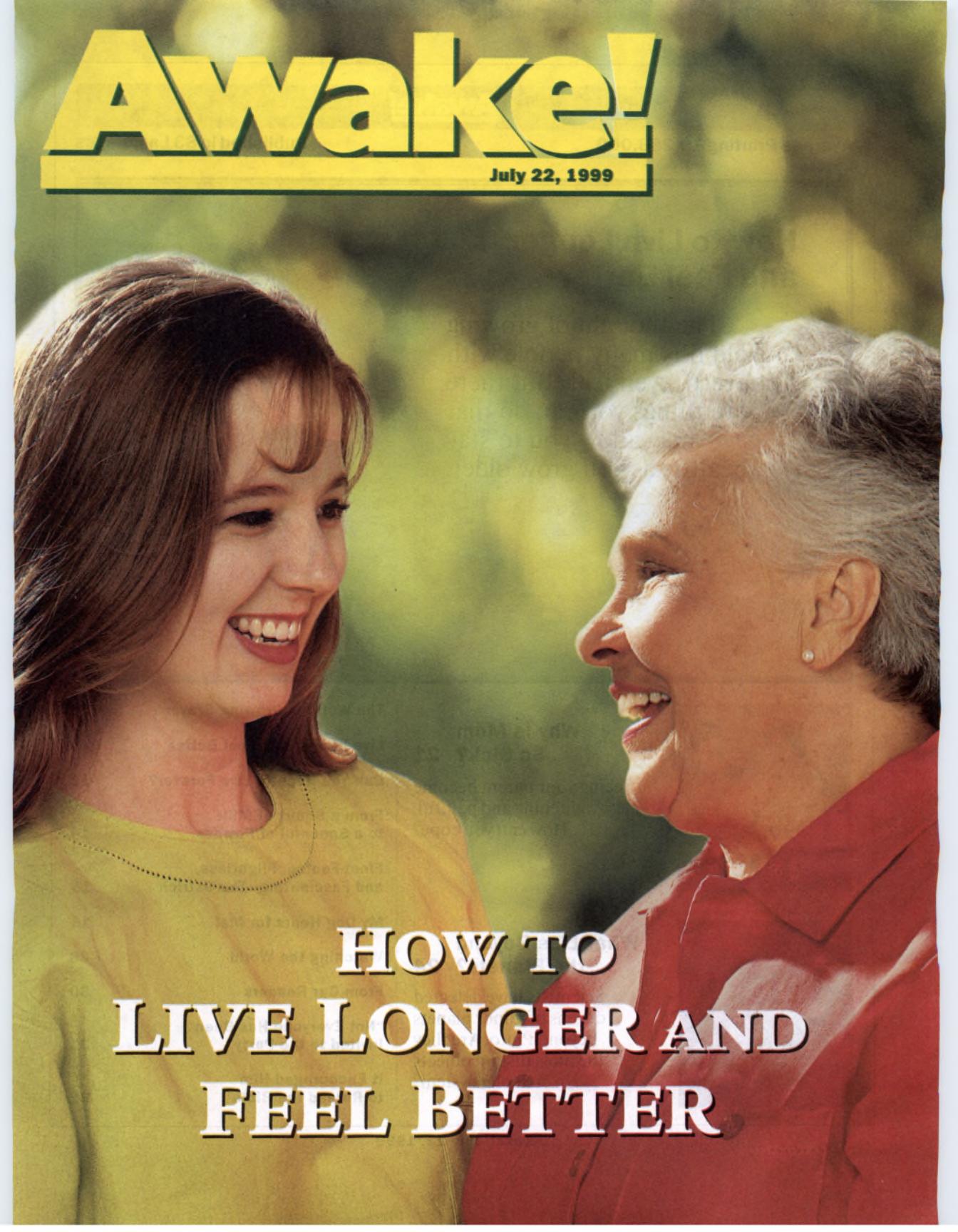


Awake!

July 22, 1999

A photograph of two women smiling. On the left, a young woman with long brown hair and bangs, wearing a yellow t-shirt, looks towards the right. On the right, an elderly woman with short grey hair, wearing a red jacket, looks towards the left. They appear to be in a park or garden setting with greenery in the background.

**HOW TO
LIVE LONGER AND
FEEL BETTER**

How to Live Longer and Feel Better 3-13

The thought of growing old fills many people with concern, even fear. But there are things you can do that may allow you to stay healthy as you grow older.



Tony and Daphne Hallas/Astro Photo



Why Is Mom So Sick? 21

Seeing your parent become ill is frightening and painful. How can you cope?

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Scientists have detected dozens of minor planets beyond Pluto. Are they the most distant objects in our solar system?

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THE WORLD IS GROWING GRAYER

IN 1513, Spanish explorer Juan Ponce de León waded ashore on a stretch of unknown coast in North America. One report says that since the territory he found was covered with flowers, he named it Florida, meaning "Flowery" in Spanish. Finding a name was easy. Finding the object of his expedition—a spring of water with the power to restore youth to older people—proved to be impossible. After combing the land for months, the explorer ended his search for the legendary fountain of youth and sailed on.

Although fountains of youth remain as elusive today as in Ponce de León's day, man seems to have discovered what author Betty Friedan called "the fountain of age." She said this because of the dramatic increase in the number of old people around the globe. So many people are now reaching old age

that the makeup of the world population is changing. The world is, in effect, graying.

"One of the Greatest Triumphs of Humanity"

Demographics tell the story. At the beginning of this century, even in the richest countries, life expectancy at birth was less than 50 years. Today, it has jumped to over 75. Likewise, in such developing countries as China, Honduras, Indonesia, and Vietnam, life expectancy at birth is 25 years longer than it was just four decades ago. Each month, one million people worldwide are reaching the age of 60. Surprisingly, not young people but those 80 years and older, the 'oldest old,' now form the fastest-growing population group on earth.

"The lengthening of life expectancy," says demographer Eileen Crimmins in *Science* magazine, "has been one of the greatest

THE INTERNATIONAL YEAR OF OLDER PERSONS

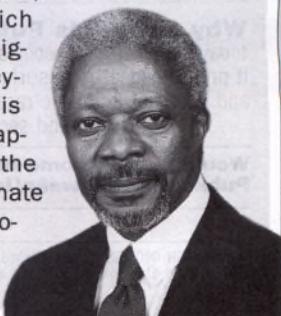
"Having turned 60 myself . . . , I am now counted among the statistics I cited earlier," said UN Secretary-General Kofi Annan recently during the launching of the International Year of Older Persons. Mr. Annan has plenty of company. Researchers say that by the turn of this century, in many countries 1 out of every 5 people will be 60 or older. Some of them will be in need of care, but all of them will be in need of ways in which they can retain their independence, their dignity, and their productivity. To help policymakers meet the challenges created by this 'demographic revolution' and to get a better appreciation of "the value of old age in society," the UN General Assembly decided in 1992 to designate 1999 as the International Year of Older Persons. "To-

wards a Society of All Ages" is the theme of this special year.

Kofi Annan UN/DPI photo by Milton Grant



UN photo



WHAT IS AGING?

"The biological crystal ball is very cloudy when we come to aging," says one researcher. "No one fully understands it," states another. Even so, gerontologists (scientists who study aging) have attempted to define it. Simply put, they say, aging is the chronological time that someone has existed. But aging is more than the passing of years. One does not normally speak of an aging child because aging has a connotation of deterioration of vitality. Aging is the toll that the passing years take on an individual. Some people seem young for their chronological age. This is implied, for example, when an individual is told that he doesn't "look his age." To distinguish between chronological and biological aging, researchers usually describe biological aging (aging accompanied by harmful physical changes) as senescence.

Professor of zoology Steven N. Austad describes senescence as "the progressive deterioration of virtually every bodily function over time." And Dr. Richard L. Sprott, of the National Institute on Aging, says that aging "is the slow deterioration of those portions of our systems that allow us to respond adequately to stresses." Most experts agree, though, that coming up with a clear definition of aging remains a challenge. Molecular biologist Dr. John Medina explains why: "From head to toe, from proteins to DNA, from birth to death, untold battalions of processes unfold to create the aging of a 60-trillion-celled human." Small wonder that many researchers conclude that aging is "the most complex of all biological problems!"



triumphs of humanity." The United Nations agrees, and to draw attention to this achievement, it has designated the year 1999 as the International Year of Older Persons. —See box on page 3.

Needed—A Change in Perception

This triumph, though, goes beyond a change in man's life expectancy. It also includes a change in man's perception of aging. True, the thought of getting old still fills many people with concern, even fear, because advanced age is usually associated with a frail body and a failing mind. However, researchers who study aging stress that getting old and getting sick are two different things. People differ considerably in the way they age. There is a difference, say researchers, between *chronological* age and *biological* age. (See the box "What Is Aging?") In other words, getting older and going downhill do not necessarily go together.

In fact, as you age, you can take steps that improve the quality of your life. Granted, these measures will not make you younger, but they may allow you to stay healthy as you grow older. The next article considers some of these steps. Even if the subject of aging is presently not high on your list of important issues, you may want to read on, for before long it will be.

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.

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LIVE LONGER AND FEEL BETTER

IMAGINE that human life is a long hurdle race—a race in which runners jump over obstacles. All runners start the race together; but as they jump over and occasionally hit the obstacles, the runners slow down, and more and more drop out.

Similarly, human life has a starting point and high hurdles along the way. During his life man encounters one hurdle after another. Each jump makes him weaker, and in time, he gives up. The higher the hurdles, the sooner he drops out, or dies. If one lives in the developed world, the drop-out point comes at about 75 years of age. This time period is called the *average* human life span—comparable to the distance most runners actually go.* (Compare Psalm 90:10.) Some people, though, run on longer, and a few even reach what is thought to be the *maximum* human life span, 115 to 120 years—a feat rare enough to make world headline news.

* Although the terms “life expectancy” and “average life span” are often used interchangeably, there is a difference between the two. “Life expectancy” refers to the number of years an individual can *expect* to live, while “average life span” refers to the average number of years that members of a population *actually* live. Thus, life-expectancy estimates are based on average life spans.

Identifying the Hurdles

People can now stay in the race almost twice as long as they could at the beginning of this century. Why? Basically because man has been able to lower the hurdles. What, though, are these hurdles? And can they be pushed even lower?

A public-health expert of the World Health Organization (WHO) explained that some of the main hurdles, or factors, affecting man’s life expectancy are habits, environment, and medical care.* Thus, the sounder your habits, the healthier your environment, and the better your medical care, the lower those hurdles are and the longer your life may last. Although

**Human life
is like a race
full of hurdles**



* In addition to these malleable factors, man’s fixed, inherited genetic makeup obviously affects his health and the length of his life. This will be discussed in the next article.

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people's circumstances vary greatly, virtually everyone—from a bank director in Sydney to a street vendor in São Paulo—can do something to lower the hurdles in his or her life. How?

Habits That Affect Your Track Record

"Not only do persons with better health habits survive longer, but in such persons, disability is postponed and compressed into fewer years at the end of life," reports *The New England Journal of Medicine*. Indeed, the first hurdle can be lowered by changing such habits as eating, drinking, sleeping, smoking, and exercise. Consider, for example, exercise habits.

Physical-exercise habits. Moderate physical exercise goes a long way. (See the box "How Much and What Kind of Exercise?") Studies show that simple exercises in and around the home help the elderly, including the 'oldest old,' to regain strength and vitality. For instance, one group of older people ranging from 72 to 98 years of age found that they could walk faster and climb stairs more easily after doing some weight-lifting exercises for just ten weeks. And no wonder! Tests taken after the exercise program showed that the

participants' muscle strength had more than doubled. Another group, made up of mostly sedentary women up to 70 years of age, exercised twice a week. After a year, they had gained in muscle mass, as well as in strength, balance, and bone density. "When we started, we were afraid we'd rip ligaments, pop tendons, tear muscles," said physiologist Miriam Nelson, who conducted the studies. "But all we got was stronger, healthier people."

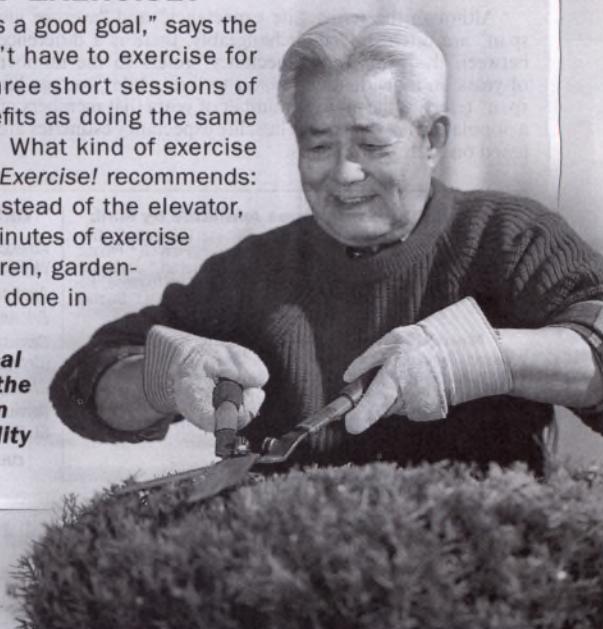
Summarizing the results of several scientific studies on aging and exercise, one textbook states: "Exercise slows the process of aging, prolongs life, and reduces the period of dependency that most often precedes death."

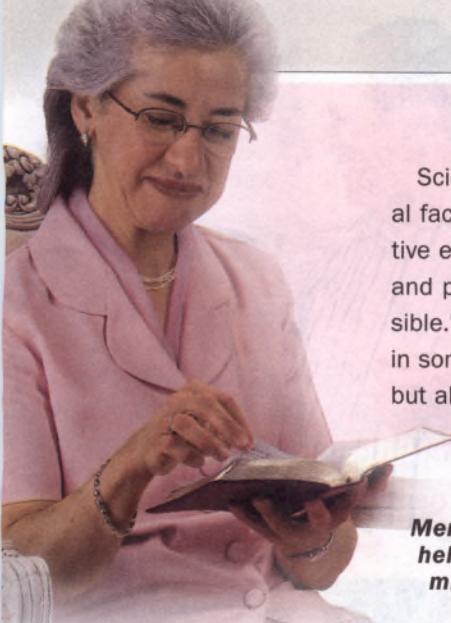
Mental-exercise habits. The adage "Use it or lose it" seems to apply not merely to the muscles but also to the mind. Although aging is accompanied by some forgetfulness, studies conducted by the U.S. National Institute on Aging show that an older brain remains flexible enough to handle the effects of aging. Hence, professor of neurology Dr. Antonio R. Damasio concludes: "Older people can continue to have extremely rich and healthy mental lives." What accounts for the continuing flexibility of older brains?

HOW MUCH AND WHAT KIND OF EXERCISE?

"Thirty minutes of moderate activity each day is a good goal," says the National Institute on Aging (NIA). But you don't have to exercise for 30 minutes all at once. Doing exercises for three short sessions of 10 minutes each is said to have the same benefits as doing the same type of exercises in one session of 30 minutes. What kind of exercise can you do? The NIA booklet *Don't Take It Easy: Exercise!* recommends: "Short bursts of activity, like taking the stairs instead of the elevator, or walking instead of driving, can add up to 30 minutes of exercise a day. Raking leaves, playing actively with children, gardening, and even doing household chores can all be done in a way that count toward your daily total." Of course, it is wise to consult your doctor before starting an exercise program.

Moderate physical activity can help the elderly to regain strength and vitality





KEEPING THE MIND FLEXIBLE

Scientific studies involving thousands of older people found several factors that help to keep an older mind flexible. They include "active engagement in reading, travel, cultural events, education, clubs, and professional associations." "Do as many different things as possible." "Keep your job. Don't retire." "Turn off the TV." "Take a course in something." It is believed that such activities not only lift the spirit but also rewire the brain.

Mental exercise helps keep the mind flexible

The brain consists of 100 billion brain cells, or neurons, and trillions of connections between them. These connections act like telephone lines enabling neurons to "talk" to one another to create, among other things, memory. As the brain ages, neurons die. (See the box "A New Look at Brain Cells.") Yet, older brains are able to compensate for neuron losses. Whenever a neuron falls silent, its neighbors respond by making new connections to other neurons and taking on the work load of the lost neuron. That way, the brain actually shifts responsibility for a given task from one region to another. Therefore, many older people accomplish the same mental tasks as younger people, but they may use different parts of the brain to do so. In some respects, an older brain acts a bit like an older tennis player who compensates for his dwindling speed by resorting to skills that younger players may lack. Yet, despite using techniques different from those of his juniors, the older player still scores.

What can older persons do to keep up the score? After studying more than 1,000 people between 70 and 80 years of age, gerontology researcher Dr. Marilyn Albert found that mental exercise is one of the factors that de-

termines which older people hang on to their intellectual prowess. (See the box "Keeping the Mind Flexible.") Mental exercise keeps the brain's 'telephone lines' alive. On the other hand, say experts, mental decline starts "when people retire, decide to take things easy, and say they don't have to keep up with the world anymore."—*Inside the Brain*.

So the good news is, explains gerontologist Dr. Jack Rowe, that "factors under our control or which we can modify should enhance our capacity to have a successful old age." Moreover, it is never too late to start forming good habits. "Even if you have had bad health habits most of your life and you change in the later years," says a researcher, "you should still reap at least some of the rewards of a healthy lifestyle."

Environment Makes a Difference

If a girl born today in London were to be transported back to London of the Middle Ages, her life expectancy would be less than half what it is today. That difference would be caused, not by a sudden change in the physical condition of the girl, but rather by an abrupt change in the height of two more hurdles—environment and medical care. First, consider environment.

Physical environment. In the past, man's physical environment—his home, for instance—was a towering health hazard. During recent decades, however, the dangers caused by physical environment have been

HEALTH TIPS FOR THE AGING

The National Institute on Aging, a division of the U.S. Department of Health and Human Services, says that "the chances of staying healthy and living a long time can be improved" by following level-headed advice, such as the following:

- Eat a balanced diet, including fruits and vegetables.
- If you drink alcoholic beverages, do so in moderation.
- Don't smoke. It's never too late to quit.
- Exercise regularly. Check with a doctor before starting an exercise program.
- Stay in contact with family and friends.
- Stay active through work, play, and community.
- Keep a positive attitude toward life.
- Do things that make you happy.
- Get regular health checkups.

lessened. Better sanitation, safer water, and a reduction in vermin in the home have improved man's environment, bolstered his health, and extended his life. As a result, in many parts of the world, man is now able to go a longer distance.* Yet, lowering this hurdle involves more than installing indoor plumbing. It also calls for maintaining a healthy social and religious environment.

Social environment. Your social environment is made up of people—the ones with whom you live, work, eat, worship, and play. Your physical environment improves when you have access to safe water; similarly, your social environment may improve when you have access to valued companions, to name one prime factor. Being able to share your joys and sorrows, dreams and frustrations, with other people lowers the height of the environmental hurdle and helps you to run a longer course.

* For more information on how to improve the home environment by simple measures, see the articles "Meeting the Challenge of Cleanliness" and "What Shapes Your Health—What You Can Do," in *Awake!* issues of September 22, 1988, and April 8, 1995.



The reverse, however, is also true. A lack of companionship may cause loneliness and social death. You tend to wither if you exist without receiving expressions of care from the people around you. One woman living in a home for the elderly wrote to an acquaintance: "I am 82 years old and I have been here at the home for 16 long years. They treat us well, but the loneliness is sometimes hard to bear." Sadly, this woman's condition is typical of that of many older ones, especially in the Western world. They often live in a social environment that tolerates but hardly appreciates them. As a consequence, "loneliness is one of the major conditions that constantly threaten the well-being of the elderly in the developed world," says James Calleja, of the International Institute on Ageing.

True, you may not be able to remove the circumstances that make you vulnerable to loneliness—such as forced retirement, declining mobility, the loss of longtime friends, or the death of a spouse—but you can still take some steps to lower this hurdle to a manage-

A NEW LOOK AT BRAIN CELLS

"We used to think that you lost brain cells every day of your life everywhere in the brain," says Dr. Marilyn Albert, a professor of psychiatry and neurology. "That's just not so—you do have some loss with healthy aging, but not so dramatic, and in very selective brain areas." Moreover, recent findings suggest that even the long-held conviction that humans cannot grow new brain cells is, at the very least, "far too sweeping," reports *Scientific American* of November 1998. Neuroscientists say that they have now collected evidence that even elderly people "do create additional neurons by the hundreds."

able height. For starters, keep in mind that feeling lonely is not caused by old age; some young people feel lonely as well. Being old is not the cause of the problem—being socially isolated is. What can you do to fight slipping into isolation?

"Make it pleasant for people to be with you," advises an older widow. "Few people enjoy associating with a grouchy person. You need to put forth the effort to be cheerful. That takes energy, it's true, but the energy you invest gives returns. Kindness begets kindness." She adds: "To make sure that I have some topics of conversation in common with the people I meet, young or old, I try to keep up with the present by reading informative magazines and following the news."

Here are some other suggestions: Learn to be interested in what other people like. Ask questions. To the extent possible, be generous. If you lack material goods, you can give of yourself; there is happiness in giving. Write letters. Take up a hobby. Accept invitations to visit other people or to go out with them. Keep your home cheerful and inviting for visitors. Reach out to people in need and offer help.

Religious environment. A growing body of evidence suggests that religious activities help older people to find "meaningfulness and significance in life" and to experience "happiness," "a sense of usefulness," "greater

life satisfaction," and "a sense of community and well-being." Why? The book *Later Life—The Realities of Aging* explains: "Religious faith provides people with a philosophy of life as well as a series of attitudes, values, and beliefs that help them interpret and understand the world around them." In addition, religious activities bring older people in contact with other people and thus "reduce the possibility of social isolation and loneliness."

For Louise and Evelyn, both widows 80 years of age and members of a congregation of Jehovah's Witnesses, these studies merely confirm what they have known for decades. "At our Kingdom Hall,* I enjoy talking to others, old and young," says Louise. "The meetings are educational. When associating after the meetings, we have some good laughs too. It's a cheerful time." Evelyn also benefits from her religious activities. "Going

* The location where Jehovah's Witnesses hold their weekly meetings is called a Kingdom Hall. These meetings are open to the public, and no collections are taken.

"Make it pleasant for people to be with you," advises a widow





out to talk with the people in my neighborhood about the Bible," she says, "keeps me from becoming isolated. But more than that, it makes me happy. Helping others to get to know the real meaning of life is satisfying work."

Clearly, Louise and Evelyn have a purpose in life. The resulting feelings of well-being they experience lower the second hurdle—environment—and help them to stay on course. —Compare Psalm 92:13, 14.

Available—Low-Cost Medical Care With High Cure Rates

Advances in medical science in this century have lowered the third hurdle, medical care, dramatically—but not globally. In several poor countries, notes *The World Health Report 1998*, "life expectancy actually decreased between 1975-1995." The director-general of WHO commented that "3 out of 4 people in the least developed countries today are dying before the age of 50—the global life expectancy figure of half a century ago."

*"At our Kingdom Hall,
I enjoy talking to others,
old and young."
—Louise*



Even so, a growing number of older and younger people in poor countries are lowering this hurdle by making use of health care that is available and affordable. Take, as an example, a new approach in the treatment of tuberculosis (TB).

Worldwide, TB kills more people than AIDS, malaria, and tropical diseases combined—8,000 each day. Of every 100 TB patients, 95 live in the world's developing countries. Some 20 million people now suffer from active TB, and some 30 million could die from it in the next ten years, a number equal to the combined populations of Bolivia, Cambodia, and Malawi.

No wonder WHO was pleased to announce in 1997 that it had developed a strategy to cure TB in six months without the need of hospitalization or high-tech medical care. "For the first time," noted *The TB Treatment Observer*, a WHO publication, "the world has proven tools and strategies to reverse the TB epidemic not only in wealthy

*"Helping others to get to
know the real meaning of
life is satisfying work."
—Evelyn*



OLDER AND WISER?

"Is there not wisdom among the aged and understanding in length of days?" the Bible asks. (Job 12:12) What is the answer? Researchers studied older people to measure such qualities as "insight, sound judgment, perspective and the ability to weigh conflicting values and generate good problem-solving strategies." According to *U.S. News & World Report*, the study showed that "older people consistently outshine younger people on all measures of wisdom, offering more-thoughtful, sophisticated advice." Studies also show that "although it often takes older people longer than youngsters to make a decision, it is usually a better one." Thus, as the Bible book of Job suggests, age is, indeed, sage.

countries, but in the world's poorest countries as well." This strategy—described by some as "the biggest health breakthrough of this decade"—is called DOTS.*

Although the cost of this strategy is much less than that of conventional TB treatments, the results are promising, especially for those living in developing countries. "No other TB control strategy has consistently demonstrated such high cure rates," says Dr. Arata Kochi, director of WHO's Global TB Programme. "DOTS produces cure rates as high

* DOTS is an acronym for directly observed treatment, short-course. For more information about the DOTS strategy, see the article "A New Defense in the Fight Against Tuberculosis," in the *Awake!* of May 22, 1999.

as 95 percent, even in the poorest of countries." By the end of 1997, the DOTS strategy had been adopted in 89 countries. Today that number has risen to 96. WHO hopes this strategy will reach many more millions of poor people in the least developed countries, thus enabling them to lower the third hurdle in the race of life.

By changing his habits, enhancing his environment, and improving his medical care, man has indeed been able to extend his *average* life span and life expectancy. The question is, Will it be possible one day for man to extend the *maximum* human life span as well—perhaps even to live without a finish line?

CAN YOU HOPE TO LIVE FOREVER?

"THERE'S something going on inside the human body to determine a maximum possible life-span of 115 to 120 years," notes Dr. James R. Smith, a professor of cell biology. "There's a limit—but we have no idea what defines it." Biologist Dr. Roger Gosden says that it is, therefore, no wonder that "scientists have yet to find a way of putting back the finish line,

and few of them even contemplate it." Is that about to change?

Facing "the Really Big Question"

Although there is no shortage of theories promising a cure for aging, most experts agree with Dr. Gene D. Cohen, president of the Gerontological Society of America, that "all these magic bullets have turned out to be blanks." Why? For one thing, says science

writer Nancy Shute, in *U.S. News & World Report*, "no one yet knows what causes aging and its inevitable consequence, death. And applying a cure to the ailment when you don't know the cause is haphazard at best." Dr. Gosden too states that aging remains an enigma: "It is expressed in each one of us but its underlying nature remains a mystery." He notes that "the really big question of why it occurs at all" gets little attention.*

Evidently, just as there is a limit to how fast humans can run, how high they can jump, and how deep they can dive, there is also a limit to how much can be explained through human thinking and reason alone. And answering "the really big question of why" is apparently beyond that limit. Therefore, the only way to find the answer is to turn to a source that is above the limits of unaided human knowledge. That is exactly what an ancient book of wisdom, the Bible, suggests that you do. Speaking about the Creator, "the source of life," the Bible assures us: "If you search for him, he will let himself be found by you." (Psalm 36:9; 2 Chronicles 15:2) What, then, does a search of God's Word, the Bible, reveal about the real reason why man dies?

The Root Cause of Death

The Bible tells us that when God created the first humans, he put "a sense of eternity in their hearts." (Ecclesiastes 3:11, Beck) However, the Creator gave man's first parents more than a desire to live forever; he also gave them the opportunity to do so. They were created with a perfect body and mind, and they enjoyed living in a peaceful environment. The Creator purposed that these first humans live forever and that in time the earth be filled with their perfect offspring.—Genesis 1:28; 2:15.

Life without a finish line was, however, conditional. It depended upon obedience to

* Gerontologists have formed numerous different theories (by one count, more than 300!) that describe *how* aging may occur. However, these theories do not explain *why* it occurs in the first place.

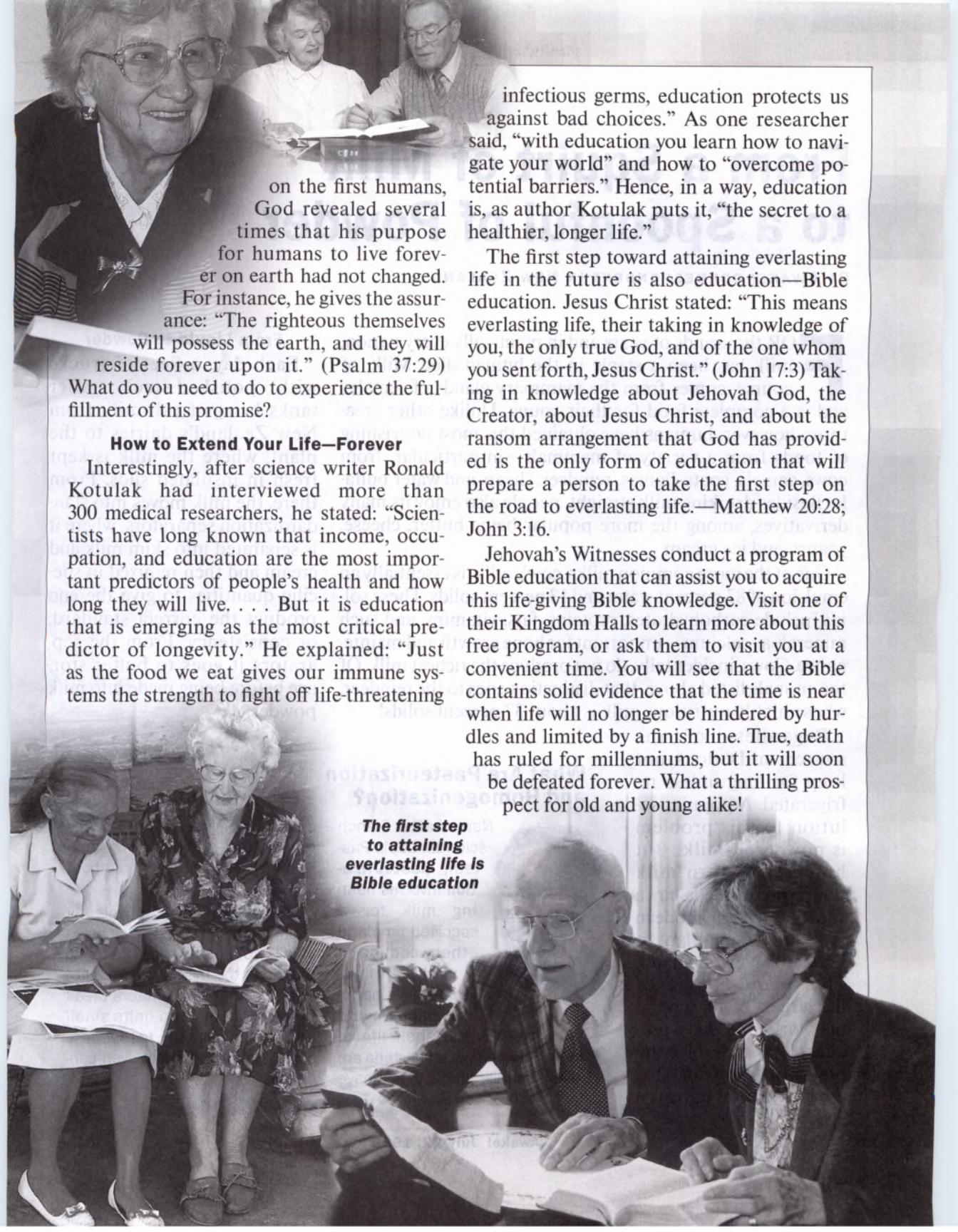
God. If Adam disobeyed God, he would "positively die." (Genesis 2:16, 17) Tragically, the first humans did disobey. (Genesis 3:1-6) In doing so, they became sinners, for "sin is lawlessness." (1 John 3:4) As a result, they no longer had the prospect of eternal life, for "the wages sin pays is death." (Romans 6:23) Therefore, when pronouncing sentence upon the first humans, God said: "Dust you are and to dust you will return."—Genesis 3:19.

Thus, after the first humans sinned, the foretold effect of sin was etched in their genes, and the finish line was put into place. As a consequence, they became subject to aging, with death as the result. In addition, after being expelled from their original Paradise home, called Eden, the first humans faced another factor that influenced their lives adversely—the hurdlelike environment outside Eden. (Genesis 3:16-19, 23, 24) This interplay of flawed heredity and harsh environment affected the first humans and their future offspring as well.

A Sentence and a Promise

Since these harmful changes in their lives occurred before the first humans produced children, they could only bring forth offspring that were like them—imperfect, sinful, and subject to the process of aging. "Death spread to all men because they had all sinned," says the Bible. (Romans 5:12; compare Psalm 51:5.) "We carry our own death warrants written in our cell structure," observes the book *The Body Machine—Your Health in Perspective*.

This, however, does not mean that there is no hope for life without a finish line—life without aging and death. First, it is reasonable to believe that the all-wise Creator of human life and other forms of life in all their awesome varieties can heal any genetic irregularities and supply the energy needed to continue man's life forever. Second, this is exactly what the Creator has promised to do. After he imposed the death sentence



on the first humans, God revealed several times that his purpose

for humans to live forever on earth had not changed.

For instance, he gives the assurance: "The righteous themselves will possess the earth, and they will reside forever upon it." (Psalm 37:29) What do you need to do to experience the fulfillment of this promise?

How to Extend Your Life—Forever

Interestingly, after science writer Ronald Kotulak had interviewed more than 300 medical researchers, he stated: "Scientists have long known that income, occupation, and education are the most important predictors of people's health and how long they will live. . . . But it is education that is emerging as the most critical predictor of longevity." He explained: "Just as the food we eat gives our immune systems the strength to fight off life-threatening

infectious germs, education protects us against bad choices." As one researcher said, "with education you learn how to navigate your world" and how to "overcome potential barriers." Hence, in a way, education is, as author Kotulak puts it, "the secret to a healthier, longer life."

The first step toward attaining everlasting life in the future is also education—Bible education. Jesus Christ stated: "This means everlasting life, their taking in knowledge of you, the only true God, and of the one whom you sent forth, Jesus Christ." (John 17:3) Taking in knowledge about Jehovah God, the Creator, about Jesus Christ, and about the ransom arrangement that God has provided is the only form of education that will prepare a person to take the first step on the road to everlasting life.—Matthew 20:28; John 3:16.

Jehovah's Witnesses conduct a program of Bible education that can assist you to acquire this life-giving Bible knowledge. Visit one of their Kingdom Halls to learn more about this free program, or ask them to visit you at a convenient time. You will see that the Bible contains solid evidence that the time is near when life will no longer be hindered by hurdles and limited by a finish line. True, death has ruled for millenniums, but it will soon be defeated forever. What a thrilling prospect for old and young alike!

***The first step
to attaining
everlasting life is
Bible education***

From a Squirt of Milk to a Spoonful of Powder

BY AWAKE! CORRESPONDENT IN NEW ZEALAND

FOR thousands of years and in practically every nation, milk has been a staple in the human diet. Milk, of course, comes from the mammary glands of females and is a complete food for their young. Unlike other creatures, however, humans have obtained this most nourishing of foods from a variety of mammals—in particular, from cows, camels, goats, llamas, reindeer, sheep, and water buffalo. Besides drinking milk straight, people also enjoy its many derivatives, among the more popular being butter, cheese, yogurt, and ice cream.

One of the more common milks, cow's milk, is essentially an emulsion of 87 percent water and 13 percent solids. These solids include carbohydrates, proteins, fats, vitamins, and such minerals as calcium—important for bone growth and maintenance. Cows, incidentally, do not produce the richest milk. Of the animals listed above, that distinction goes to the reindeer, whose highly nutritious milk is about 37 percent solids!

Regardless of the source, milk does not keep for long unless refrigerated. A popular solution to this problem is powdered milk. But how do you turn milk into powder? Let's pay a short visit to a modern milk processing plant at Waikato, New Zealand. This plant is one of the largest of its type in the world and daily produces 400 tons of complex milk powders for the global food industry.

From Liquid to Powder

Each day, a fleet of trucks with polished-steel trailer tanks brings fresh milk from New Zealand's dairies to the plant, where the milk is kept fresh in insulated silos. From there, the milk moves into standardization separators, where it is separated into skim milk and cream and then remixed in specific quantities to give the end product the correct standard, or consistency. From the separators it goes to buffer storage before being made into milk powder.

What Are Pasteurization and Homogenization?



Named after French scientist Louis Pasteur, **pasteurization** involves heating milk for a specified time and then cooling it quickly. This process kills harmful bacteria and thus extends the shelf life of milk. However, not all bacteria are killed, so milk products still have

a limited shelf life. When properly refrigerated, high-quality pasteurized milk has a shelf life of about 14 days.

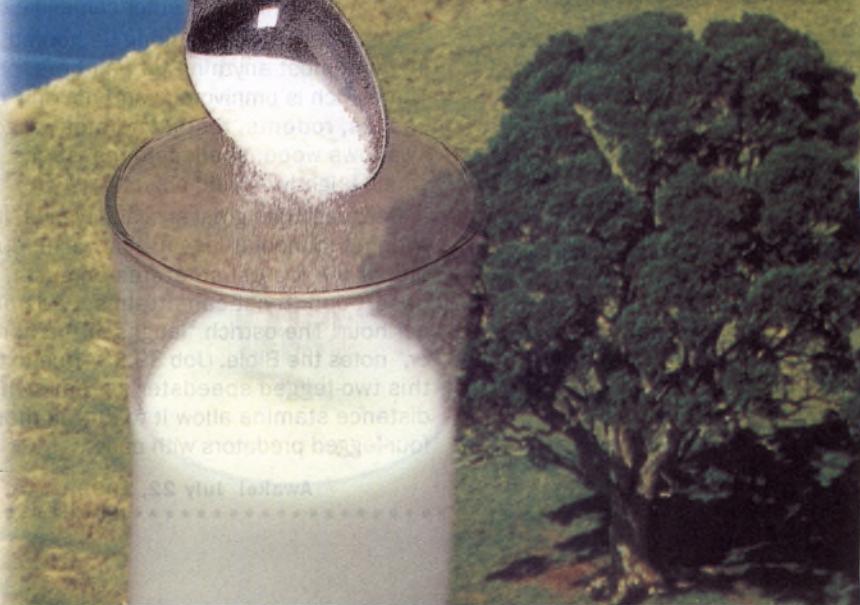
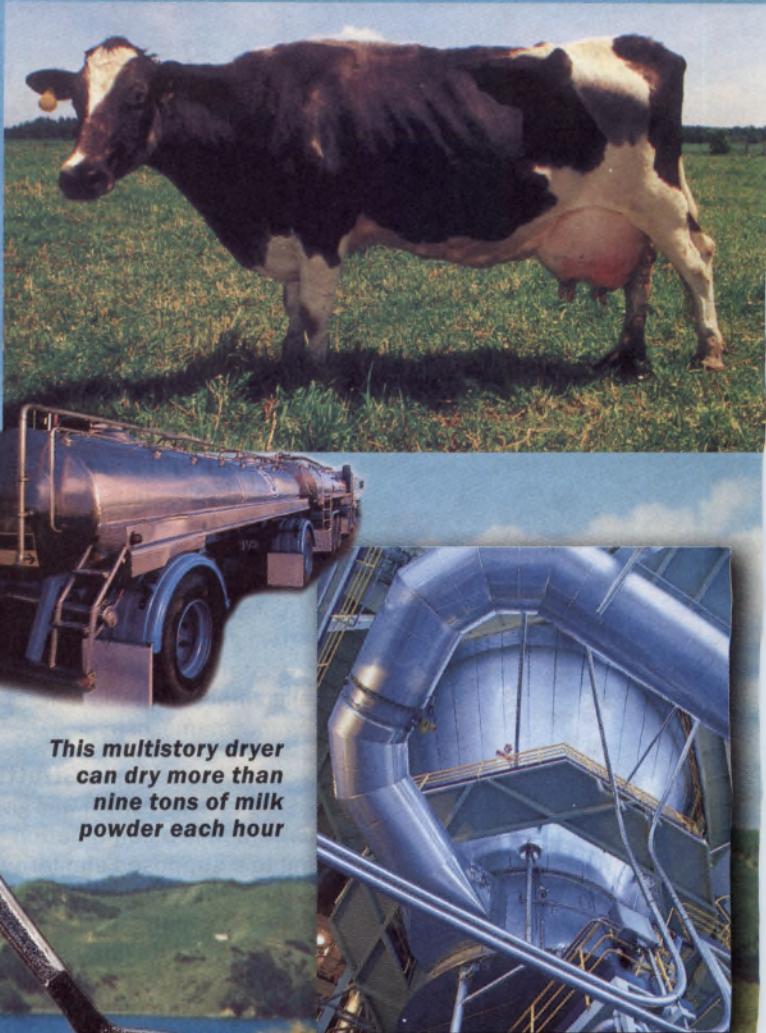
Homogenization physically changes the fat or cream globules in milk so that they do not float to the top of the milk and form a layer of cream. Homogenizers break up fat globules into units small enough to remain in suspension, giving milk a rich, even consistency.

By courtesy of U.S. National Library of Medicine

Following pasteurization, the milk is boiled under vacuum. Why under vacuum? This ensures that the milk boils at a much lower temperature than normal, minimizing heat damage. When this stage of evaporation is complete, the solid concentration of the milk is approximately 48 percent. This concentrated product is now ready for the final process—drying.

The drying process begins with the concentrated milk being piped to the top of a multistory stainless steel dryer, where it is sprayed into heated air inside the dryer. The milk's moisture content now falls to 6 percent, and it becomes a powder. One more stage reduces the moisture to 3 percent, after which the powder is gently cooled in preparation for packaging and shipping. The whole process is rigorously executed with minimal loss of the milk's nutritional value and goodness.

You might live in an area where fresh milk is readily available. But many people live in isolated areas where fresh milk is hard to obtain and is expensive. Thanks to the marvel of powdered milk, their problems are solved. They just mix a few spoonfuls of powder with water, and the reconstituted milk, though not as tasty as fresh milk, does the job admirably.



*Fleet-Footed,
Flightless, and
Fascinating*

—The Ostrich

By *Awake!* correspondent in Kenya



A male ostrich

AMONG the giraffes, zebras, wildebeests, and gazelles that roam the vast African savanna dwell some of the most remarkable creatures ever designed by the Creator. People who see them are awed by their large size, great height, powerful legs, and beautiful fluffy feathers. Standing up to eight feet tall and weighing up to 345 pounds, they are the largest birds in existence. In the Swahili language, these birds are called *mbuni*, but you may recognize them by their more common name, ostrich.

Like a Strutting Camel

Long ago the ostrich was given the name *struthocamelus*, which is a combination of Latin and Greek, referring to a supposed similarity to camels. Like the camel, the ostrich is tolerant of high temperatures and thrives in desert country. It also has long luxuriant eyelashes, which protect its large eyes from the dust of the bushveld. Its legs are long and sinewy, and its feet are strong and fleshy, with only two toes. Seeing the ostrich strutting about in the open plains, observers are amazed at its agility, endurance, and other camellike characteristics.

The ostrich grazes among its hooved neighbors, feeding on almost anything that slithers, creeps, or crawls. The ostrich is omnivorous and not only dines on insects, snakes, rodents, roots, and most vegetation but also swallows wood, shells, stones, sticks, and almost any small, brightly colored object.

Because of its great size and weight, it cannot fly. However, its muscular legs are powerful enough to make it one of the fastest creatures on earth. Running across desert country, it can attain speeds of up to 40 miles per hour! The ostrich "laughs at the horse and at its rider," notes the Bible. (Job 39:18) True to that observation, this two-legged speedster's great swiftness and long-distance stamina allow it to outrun many of the fastest four-legged predators with ease.



Ostriches are among the fastest creatures on earth

Their feet can be powerful weapons





Nesting Habits

During the breeding season, the male ostrich performs elaborate courtship displays. Kneeling before the female, he extends his large white-and-black wing feathers and begins to shake them rhythmically. Like two enormous fans, they move from side to side. His bare neck and legs begin to blush, turning a bright pink color, which contrasts beautifully with his jet-black body feathers. Swinging his long neck from side to side, he stamps the ground with his feet.

Likely this fancy show of feathered finesse is designed to impress the drab-colored female. Yet, often enough, as the male continues his nuptial courting dance, the female moves about pecking the ground, inattentive and indifferent to the commotion going on around her.

Once a female is selected, the male chooses a nesting site. He will scratch a shallow depression in the dust somewhere in the open savanna and will lead several females to it. After two or three weeks, the nest contains two dozen or more eggs, laid by those females.

Throughout the six weeks that it will take to incubate the eggs, the male will sit on the nest during the night, and one female will do so during the day. At this

point the eggs are vulnerable and are sought after by hungry lions, hyenas, jackals, and even Egyptian vultures, who break open eggs by throwing stones against their shells.

Giant Eggs, Enormous Chicks

The gray-white or ivory eggs of the ostrich are the largest in the world and can weigh about three pounds each. The shell is hard and glossy and has a glazed, porcelain-like finish. Each egg is the equivalent of 25 hens' eggs, and ostrich eggs are prized for their rich contents and delicious taste. Empty shells are sometimes used as containers by Bushmen, who fill them with water.

When the huge egg reaches the stage of hatching, it produces an enormous chick! Newborns are defenseless, but they grow fast and are born runners. Within a month their stout legs carry them at speeds approaching 35 miles per hour!

Protection of the chicks rests with the parent birds. That the ostrich buries its head in the sand when faced with danger is a myth. On the contrary, parent birds can be fiercely aggressive when protecting their brood, driving away predators with powerful kicks. Another defense tactic they employ is distracting the predator by pretending to be wounded, thus drawing attention away from their





A female ostrich

young and to themselves. However, if a predator comes too close to them, the parents usually turn tail and run for their lives, leaving their young to fend for themselves. The Bible statement is proved true, for on these occasions the ostrich "does treat her sons roughly, as if not hers."—Job 39:16.

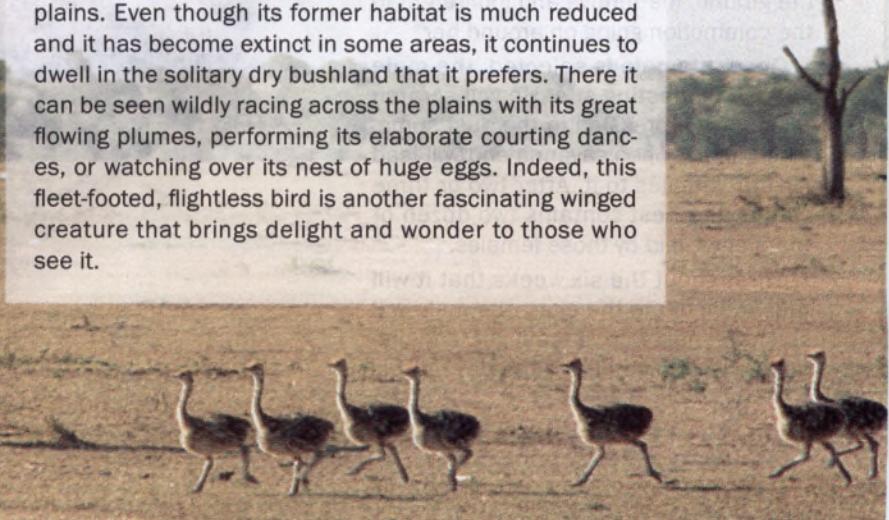
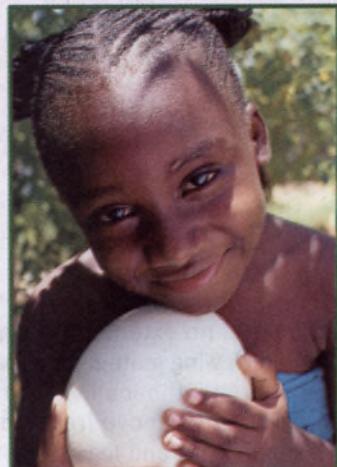
Luxuriant Plumes

For thousands of years, man has admired the ostrich. Pictures carved in stone depict ancient Egyptian kings hunting the ostrich with bows and arrows. Some civilizations considered the ostrich sacred. The Chinese prized the beautifully symmetrical ostrich eggs and offered them as precious gifts to rulers. For thousands of years, luxuriant flowing plumes of ostrich feathers have adorned the headdresses of military generals, kings, and African chiefs.

In the 14th century, ostrich feathers became highly valued by fashion-conscious Europeans. Yet, hunting the ostrich with spears and arrows was not easy, since the animal has keen eyesight and swiftly flees from danger. At that time, the ostrich was in no danger of extermination.

Then, in the 19th century, ostrich feathers again became fashionable. This time, armed with modern weapons, hunters slaughtered ostriches by the millions. The advent of ostrich farms probably saved the huge flightless bird from extinction. Now bred in captivity, ostriches have been domesticated and are raised to provide feathers for fashion and for feather dusters. Their skin is made into soft leather gloves and handbags, and their meat is served in some restaurants.

Today the magnificent ostrich still roams the African plains. Even though its former habitat is much reduced and it has become extinct in some areas, it continues to dwell in the solitary dry bushland that it prefers. There it can be seen wildly racing across the plains with its great flowing plumes, performing its elaborate courting dances, or watching over its nest of huge eggs. Indeed, this fleet-footed, flightless bird is another fascinating winged creature that brings delight and wonder to those who see it.



My Dog Hears for Me!



BY AWAKE! CORRESPONDENT IN BRITAIN

DON'T know what I would do without my little dog!" Dorothy exclaimed, looking affectionately at a young white-and-tan crossbred Jack Russell terrier lying contentedly under her chair. "I have had Twinkie for only a few months, but already she has given me a new lease on life!"

Peering closer, I saw that Twinkie was wearing a close-fitting yellow body harness upon which was printed in bold black letters "HEARING DOG FOR THE DEAF." "What an extraordinary animal!" I remember thinking to myself. "What can it do?"

Ours was a chance meeting among 44,000 people attending the "God's Way of Life" International Convention of Jehovah's Witnesses last July in London, England. By sitting close to a loudspeaker, Dorothy was able to hear the program, so why did she need a hearing dog? As we sat talking during a lunch break, Dorothy told me her story.

Twinkie's Role

Dorothy is profoundly deaf as a result of a bout of rheumatic fever at the age of three. Since her husband's death 23 years ago, she has lived alone, but, as Dorothy explained, she needed more than companionship as she got older. "Deaf people can feel very insecure at my age," she said. "I am 74 and live in a warden-secure apartment, but when the caretaker comes to see me, I can never hear my doorbell. Thinking that I might not be feeling well, he has sometimes let himself in without my knowing it; and that has given me quite a fright. But now Twinkie hears the bell, and she comes and taps on my leg and leads me to the front door. Similarly, when Twinkie hears the buzzer on my oven timer, she runs up to me, and I follow her. In the event of a smoke or fire alarm, Twinkie is trained to attract my attention and then lie down to indicate potential danger. Each time she helps me, I reward her with a special treat, a savory tidbit."

Training With Skill

I was intrigued. "How did you get your dog, and who trained her?" I asked. This was the cue for Dorothy to tell me something about Hearing Dogs for Deaf People, a charity whose purpose is to help deaf people in Britain achieve greater independence and thus improve their quality of life. Since 1982 it has placed hundreds of dogs with deaf individuals in Britain. Once fully trained, a dog is transferred to its new owner by adoption, free of charge.

The dogs chosen are usually strays, often taken from rescue centers across the country, although some are donated by breeders. It takes up to 12 months to train a dog. The cost is often met by a sponsor, either a company or a group of people whose smaller contributions are combined. Dorothy told me that a slimming club had kindly sponsored Twinkie.

Once chosen, each potential hearing dog, ranging in age from seven weeks to three years, is trained to respond to certain sounds. Initially, however, it is assigned to a socializer, a volunteer who takes the dog home for two to eight months, depending on the dog's age and experience. Socializing may include basic housebreaking, but the main goal is to get the animal familiar with public places and transport and to give it a wide variety of experience with people of all ages, including children and babies. The aim is to train the dog to behave acceptably under any circumstance in which it may eventually find itself.

In addition, I learned that other organizations use dogs to assist those with special needs. As well as being trained to heed commands, these dogs are exposed to specific sights and smells. One retriever caring for a woman confined to a wheelchair has been taught to pick up her telephone and letters and to lick stamps for the mail! Another dog responds to 120 commands, even collecting cans and packets from supermarket shelves. The disabled owner uses a laser dot to identify items that he has chosen, and his dog then takes them to him.

A Happy Partnership

"Does everybody appreciate the value of Twinkie?" I asked. "One storekeeper refused my dog entry," Dorothy replied. "I think this was because he had some food on display, but his attitude really was an excep-

tion, as he did not understand why I need Twinkie."

I now understood the value of a hearing dog in the home, but I had one more question. Of what value was Twinkie when Dorothy was happily mixing with so many fellow Christians? "I can lip-read well, and my hearing aid helps me to hold a conversation,"

**Twinkie's
help is
Invaluable at
conventions**



Dorothy explained. "When people see Twinkie's yellow jacket, they know immediately that I am deaf. They then speak directly to me, usually as clearly as they can. Thus, I don't have to explain my disability, and that makes life much easier for me."

The convention sessions were due to recommence, and Twinkie needed a walk before settling down for the afternoon. Before taking my leave, I bent down to stroke her. Twinkie opened her bright eyes and then looked up at Dorothy and wagged her tail. Such a docile, useful little friend—and their rapport was complete!

YOUNG PEOPLE ASK . . .

Al's father died of cancer.* Having been taught the Bible's promise of a resurrection, Al somehow managed to cope with his loss. But when his mother was diagnosed with cancer, the nightmare started all over again. The thought of losing yet another parent terrified Al. 'Why does it have to be my mother who is sick?' he would ask himself bitterly.



ACCORDING to Dr. Leonard Felder, "there are over sixty million Americans who are . . . faced with the illness or disability of a loved one." Felder adds: "On any given day, about one out of every four American workers has the added job of responding to the needs of an ailing parent" or other loved one. If you are in such a situation, you are not alone. Nevertheless, seeing someone you love become ill is frightening and painful. How can you possibly cope?

Why Is My Parent Sick?

Proverbs 15:13 says: "Because of the pain of the heart there is a stricken spirit." It is quite normal to experience a flood of emotions when your parent is ill. For example, you may feel guilty about your parent's plight. Perhaps you and your parent have been having some difficulties in getting along. You may have had a heated argument or two. Now that your parent is ill, you may somehow feel that it is your fault. But while family bickering may cause stress, it is rarely a cause of serious illness. Tensions and minor dis-

agreements can occur even in loving Christian households. So you need not carry a burden of guilt, as if you were to blame for your parent's health problems.

Ultimately, your mom or dad is sick because of the sin of our first parents, Adam and Eve. (Romans 5:12) Because of that original sin, "all creation keeps on groaning together and being in pain together until now."

—Romans 8:22.

Painful Feelings

Even so, you may be worried and anxious. Terri's mother suffers from lupus, a disorder with devastating effects. Admits Terri: "Whenever I'm away from home, I'm worried, wondering if Mom is OK. I find it difficult to concentrate. However, since I don't want her to worry, I keep my feelings to myself."

Proverbs 12:25 says: "Anxious care in the heart of a man is what will cause it to bow down." Depression is quite common among

* Some of the names have been changed.

youths in this situation. Terri says it was heartbreaking when she saw that her mother could not perform simple tasks. Adding to the stress is the fact that youths—girls in particular—are often forced to take on additional responsibilities. According to Professor Bruce Compas, “girls get burdened with family responsibilities, such as housekeeping and caring for younger siblings, that are beyond their ability to cope and which interfere with their normal social development.” Some teenagers retreat into their own world, listening to gloomy and depressing music.—Proverbs 18:1.

“Whenever I’m away from home, I’m worried, wondering if Mom is OK”

Fear that one’s parent may die is also common. Terri is an only child, and her mother, a single parent. Terri found herself crying every time her mother went to the hospital, fearing that she would never return. Says Terri: “It was just the two of us. I didn’t want to lose my best friend.” A teenage girl named Martha similarly admitted: “I’m eighteen, but I’m still afraid of losing my parents. It would be such a devastating feeling of loneliness.” Other common reactions to a parent’s illness are sleep disturbances, nightmares, and eating disorders.

What You Can Do

As difficult as things might seem right now, you can cope! Begin by sharing your fears and anxieties with your parents. Just how serious is your parent’s condition? What is the likelihood of his or her recovering? What arrangements have been made for your care should your parent fail to recover? Is there any chance that you will develop a similar

condition later on in life? Although it is difficult for parents to talk about such things, if you calmly and respectfully ask for their help, they will likely do their best to be helpful and supportive.

Share your positive feelings too. Al recalls his failure to do so when he learned that his mother was dying of cancer. He says: “I didn’t tell her how much I loved her. I knew she wanted to hear me say it, but as a teenager I felt funny expressing such feelings to her. Shortly afterward she died, and I feel guilty now because when I had the chance, I didn’t take advantage of it. I regret that because she was the most important person in my life.” Do not hold back from letting your parents know how much you love them.

If possible, educate yourself regarding your parent’s illness. (Proverbs 18:15) Perhaps your family doctor can assist you in this regard. Being well-informed will help you to be more empathetic, patient, and understanding. And it can help prepare you for any physical changes your parent may suffer, such as scars, hair loss, or fatigue.

Is your parent in the hospital? Then make your visits cheerful and upbuilding. Keep your conversation as upbeat as possible. Share news about your schoolwork and Christian activities. (Compare Proverbs 25:25.) If you live in a country where relatives are expected to provide food and other services for a patient, do your share of the work without complaint. Having a neat and well-groomed appearance will not only cheer your parent but also make a good impression on hospital workers and doctors. This could improve the quality of the care your parent receives.*

Is your parent recuperating at home? Then do what you can to assist with his or her care. Volunteer to take on a reasonable share of the

* The article “Visiting a Patient—How to Help,” in the March 8, 1991, issue of *Awake!* has a number of practical suggestions.

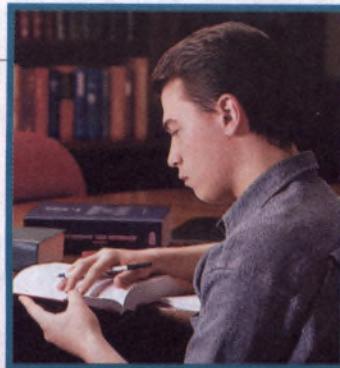
**Learning the facts
about your parent's
illness can better equip
you to be of help**

household chores. Try to imitate Jehovah by giving of yourself 'generously and without reproaching.' (James 1:5) Do the best you can to display an uncomplaining, optimistic, positive spirit.

Of course, you still have schoolwork. Try to set aside time for it, as your education is still important. If possible, leave some time for rest and recreation. (Ecclesiastes 4:6) This will refresh you and help you to be of better support to your parent. Finally, avoid isolating yourself. Take advantage of the support of fellow Christians. (Galatians 6:2) Says Terri: "The congregation became my family. The elders were always ready to talk with me and to encourage me. I will never forget that."

Keeping Your Spiritual Balance

Most important of all is maintaining your spiritual balance. Keep yourself busy with spiritual activities, such as studying the Bible, attending meetings, and preaching to others. (1 Corinthians 15:58) During the summer months, Terri would increase her share in the evangelizing activity as an auxiliary pioneer. She adds: "Mom always encouraged me to prepare for and attend the meetings at the Kingdom Hall. That proved to be good for both of us. Since she couldn't attend every meeting as she wanted to, I paid more than the usual attention so that I could tell her about it later. She depended on me to



provide her with the spiritual food when she couldn't be there."

An article in *The New York Times* summed things up well when it spoke of a social worker who has been "continually surprised at how much children can grow and even thrive despite the trauma of parental illness." She says: "They develop some skills they didn't know they had... If they can get through this, they can get through many things."

You too can get through this difficult period. Terri's mother, for example, is now stable enough to care for herself. Perhaps, in time, your parent will also recover. But in the meantime, do not forget that you have the support of your heavenly Friend, Jehovah. He is the "Hearer of prayer" and will listen to your cries for help. (Psalm 65:2) He will give you—and your God-fearing parent—"the power beyond what is normal" so that you can cope.—2 Corinthians 4:7; Psalm 41:3.





WHAT LIES BEYOND THE PLANETS?

Planet X. This name was given by astronomer Percival Lowell to an undiscovered planet that he suspected was orbiting beyond Neptune. His search for Planet X began in 1905 at his observatory in Flagstaff, Arizona. Although Lowell died before finding Planet X, the search he began continued. Finally, in 1930, at Lowell's observatory, Clyde Tombaugh discovered the planet Pluto. Planet X did exist!

Astronomers immediately began to wonder, 'Could another Planet X be found?' Six decades of intense hunting followed, and in later years of the search, even spacecraft were used. Although thousands of asteroids, stars, galaxies, and nebulas were discovered, no new planets were identified.

Yet, the search did not cease. Scientists began to use new technologies and more powerful telescopes to detect orbiting objects that are millions of times fainter than can be seen by the naked eye. Their efforts

finally paid off. Amazingly, *dozens* of minor planets beyond Pluto have now been sighted!

Where are those small planets? How many more may yet be found? Are they the most distant objects in our solar system?

The Farthest Objects

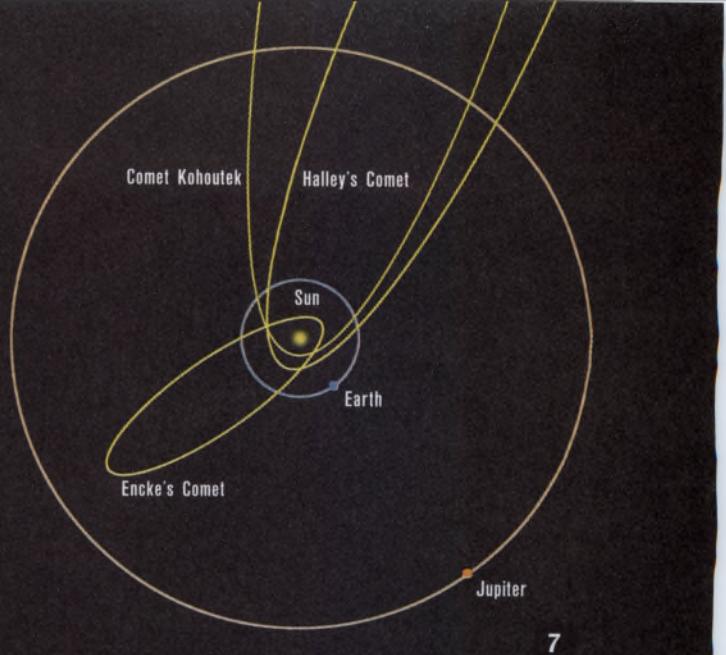
The solar system consists of nine planets orbiting the sun. In addition, thousands of rocky asteroids hurtle through space, mostly in a belt between Mars and Jupiter. Nearly a thousand comets have been spotted as well.

Which of these objects travel the greatest distance from the sun? Actually, the comets do, by far.

The word "comet" originates from the Greek word *ko-me'tes*, meaning "long haired"—referring to the long, sweeping tails trailing behind their bright heads. Comets have been the source of much su-



1. Comet Hale-Bopp in 1997
2. Edmond Halley
3. Percival Lowell
4. Halley's Comet in 1985



5. Halley's Comet in 1910
6. Jets of gas and dust emanating from
Halley's Comet
7. Orbits of several comets

perstition and hysteria. Observers still refer to comet visits as apparitions. This stems from early beliefs that they were ghostly objects. Why have they been greatly feared? One reason is that their appearances have sometimes coincided with tragic events.

Comets still evoke fanaticism. In March 1997, in California, U.S.A., 39 members of the Heaven's Gate cult committed mass suicide as the comet Hale-Bopp approached the sun. Why? Because they expected that an alien spacecraft, supposedly hiding behind the comet, was coming to pick them up.

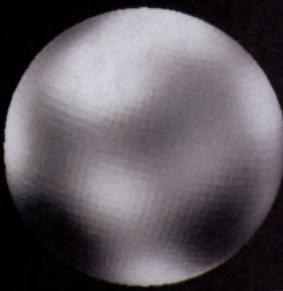
Not everyone has viewed comets irrationally. In the fourth century B.C.E., Aristotle proposed that comets were clouds of luminous gas high up in the sky. A few centuries later, the Roman philosopher Seneca astutely suggested that comets were orbiting, heavenly bodies.

With the advent of the telescope and the discovery of Newton's law of gravitation, the study of comets became a more precise science. By 1705, Edmond Halley had determined that comets orbit the sun on long, elliptic paths. Furthermore, he noted that comets appearing in the years 1531, 1607, and 1682 had similar trajectories and were separated by regular intervals of about 75 years. Halley correctly suggested that each of these sightings was of the same orbiting comet, later named Halley's Comet.

Researchers now know that comets have a solid nucleus, generally between 1 and 12 miles across. The nucleus can best be described as a dark, dirty iceberg made up mostly of water ice mixed with dust. Close-up images of Halley's Comet taken by the Giotto spacecraft in 1986 show jets of gas and dust emanating from the comet. These emissions make up the bright comet head and tail seen from the earth.

4) Courtesy of Anglo-Australian Observatory, photograph by David Malin; 5) National Optical Astronomy Observatories;
6) the Giotto Project, HMC principal investigator Dr. Horst Uwe Keller, the Canada-France-Hawaii telescope

8



9



10



11

8. Before it impacted Jupiter in 1994, comet Shoemaker-Levy 9 had broken into 21 fragments

9. Surface of Pluto

10. Comet Kohoutek, 1974

11. Asteroid Ida with its moon Dactyl

Comet Families

Two families of comets orbit the sun. A comet's classification is based on its orbital periods, or the amount of time it takes to complete one revolution around the sun. Short-period, or periodic, comets—like Halley's Comet—take fewer than 200 years to make each trip around the sun. Their orbits follow paths close to the ecliptic, the celestial plane in which the earth and other planets orbit the sun. There may be a billion periodic comets, most of which are orbiting beyond the outermost planets Neptune and Pluto, billions of miles from the sun. Occasionally, some of these, such as Encke's Comet, have their orbits pulled in nearer to the sun by close encounters with planets.

What about the orbits of long-period comets? Unlike their short-period counterparts, long-period comets circle the sun from all directions. They include the comets Hyakutake and Hale-Bopp, which put on spectacular displays during their recent ap-

pearances. However, they are not expected back for thousands of years!

A huge collection of long-period comets move about in the outermost parts of the solar system. This swarm has been named the Oort cloud, after the Dutch astronomer who, in 1950, first suggested its existence. How many comets make up this cloud? Astronomers estimate more than a trillion! Some of these comets travel to distances of a light-year or more from the sun.* With those distances, a single orbit may take well over ten million years!

Myriads of Small Planets

The newly identified minor planets mentioned at the outset share their realm beyond Pluto with short-period comets. Since 1992, astronomers have discovered about 80 of these small, planetlike bodies. There may be tens of thousands of them larger than

* One light-year equals the distance light travels in a year, or about six trillion miles.

COMETS AND METEOR SHOWERS

When watching a spectacular meteor flash across the sky, do you wonder if it came from a comet? It may have. When a comet approaches the sun, its icy nucleus gradually disintegrates, releasing a trail of rock grains, or meteoroids. These grains are not as light as the dust in a comet tail and are thus

not blown out into space by the solar wind. Instead, they form a swath of debris that orbits the sun along the parent comet's path.

Each year, the earth encounters a number of these meteoroid streams. The Leonid meteor shower in mid-November results from material left be-

hind by the comet Tempel-Tuttle. This shower puts on an exceptional display every 33 years. Sky-watchers viewing the Leonid shower of 1966 reported seeing more than 2,000 meteors per minute—a virtual storm! In 1998 it produced dazzling fireballs, and it should certainly be worth watching this November.

60 miles across. These miniplanets make up the Kuiper belt, named for a scientist who nearly 50 years ago suspected its existence. The Kuiper-belt objects are probably made up of a combination of rock and ice.

Have the recent discoveries of these small planets changed the way the inner solar system is viewed? Indeed! Pluto, its moon Charon, Neptune's satellite Triton, and some other icy objects in the inner solar system are now thought to be objects that came from the Kuiper belt. Some astronomers even think that Pluto no longer qualifies as a major planet!

Where Did They Come From?

How did comets and minor planets come to be in abundance in the Kuiper belt? Astronomers suggest that these objects grew from an early cloud of dust particles and condensing ice, which stuck together to form larger objects. However, these objects were too thinly spread out to continue to grow into large planets.

Long-period comets also represent a substantial part of the solar system. Altogether, these comets have a mass some 40 times as great as earth's. Most are thought to have formed early in the solar system's history in the region of the outer gas-giant planets.

What propelled these comets out to their present orbits so far from the sun? Apparently, large planets, such as Jupiter, acted

as powerful gravitational slingshots on any comets that came near them.

Exploring Comets

Comets consist of some of the most primitive material in the solar system. How can these fascinating objects be explored further? Occasional visits to the inner solar system by some comets enable them to be studied up close. Various space agencies plan to send a number of spacecraft to explore comets over the next several years.

Who knows what may yet be found in our solar system? The new discoveries and understanding of distant objects orbiting the sun add force to the Bible passage recorded at Isaiah 40:26: "Raise your eyes high up and see. Who has created these things? It is the One who is bringing forth the army of them even by number, all of whom he calls even by name."

IN OUR NEXT ISSUE

Does Fate Control Your Life?

**Religious Unity in Marriage
—Why Important**

The Bird That Kisses Flowers

WATCHING THE WORLD

Top Ten Infectious Killers

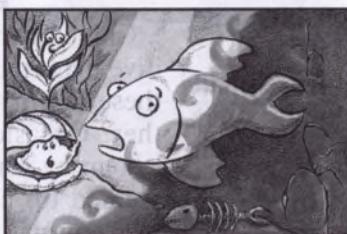
Worldwide, millions of people die every year of infectious diseases. According to *Natural History* magazine, the following infectious diseases were the most deadly in 1997. Acute lower respiratory infections, such as pneumonia, topped the list by killing 3.7 million people. Second was tuberculosis, causing 2.9 million deaths. Cholera and other diarrheic diseases were third, with 2.5 million deaths. AIDS killed 2.3 million. Between 1.5 million and 2.7 million people died from malaria. Measles accounted for 960,000 deaths. Hepatitis B caused 605,000 deaths. Whooping cough claimed 410,000 lives. Another 275,000 died from tetanus. And 140,000 died from dengue/dengue hemorrhagic fever. In spite of man's best efforts, infectious diseases of the past still threaten human health throughout much of the world today.

Alcohol Abuse in Venezuela

Venezuelans drink more alcohol per capita than any other Latin-American country, reports *El Universal* newspaper, of Caracas. It is estimated that each person in Venezuela consumes between 60 and 70 quarts of liquor a year. The Ministry of Health calculates that 50 percent of all murders and suicides that occur in the metropolitan area of Caracas are linked to alcohol. A study conducted by the Central University of Venezuela, the Center for Peace, and the Judicial

Police, however, claims that more than 9 out of 10 violent deaths that occur in that area involve alcohol. To help combat alcohol abuse, workshops have been set up to teach students how to resist peer pressure to drink and how to explore responsible alternative activities as well as encourage effective communication between parents and children.

Troubled Waters



Throughout the world, coral reefs are being decimated by tumors, lesions, infections, and other threats, reports *Science News*. Marine biologist James Cervino notes that at least 15 new coral-killing syndromes have appeared over the past 20 years. Some other forms of ocean wildlife that are being threatened include sea grass, shellfish, sea turtles, and manatees. "The biosphere—the place where life occurs—is 95 percent ocean," says oceanographer Sylvia Earle. "If the oceans are in trouble, so are we. And the oceans are in trouble."

Light Reading

Not everyone with shelves full of books is an avid reader. Shopkeeper Chris Mattheus, for instance, admits: "I like to

surround myself with books, but I seldom read." Mattheus now offers a cheap solution to the problem. He has, together with a partner, opened Germany's first shop for fake books, reports the newspaper *Weser-Kurier*. Some 2,800 "blind book titles" from the fields of art, philosophy, and science are for sale. The fakes come in different designs, ranging from simple cardboard books to lavish replicas made of high-grade teak. Attractive imitations of art books, which normally command outrageous sums, cost just \$10 to \$15. Mattheus says: "The price varies according to centimeter, not content."

Healthful Video Games

Mention the term "video games" and many people envision games filled with violence. However, researchers have found that "the right games can train kids with diabetes and asthma to keep their conditions under control," reports *Technology Review*. Stanford University Medical Center conducted a study of about 60 diabetic children between 8 and 16 years of age. Half the children played a standard video game. The other half played *Packy & Marlon*, a game involving two animated elephants that help players choose the right foods to eat, check their blood glucose level, and use insulin correctly. Over a six-month period, those who played the elephant game "needed 77 percent fewer urgent-care visits to a doctor

or emergency room" than the children who played the standard game, says *Technology Review*. Similar video games have been designed to help children manage asthma and avoid smoking.

AIDS on the Rampage

In sub-Saharan Africa during the past decade, life expectancy at birth has dropped by nearly six years, and it is expected to fall further. Why the change? Because in countries in this area, "the Aids pandemic is raging," reports *The UNESCO Courier*. Presently, more than 10 percent of the population in this region are infected with HIV, the virus that causes AIDS. The worst-hit countries are Botswana, Malawi, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe. Moreover, the United Nations says that "there are 5,500 AIDS-related funerals every day in Africa," reports *The New York Times*.

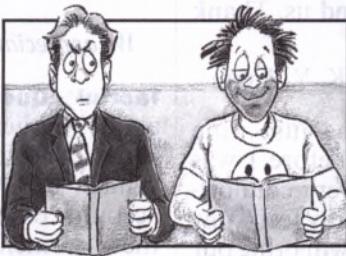
Catechism—A Disaster

In a recent pastoral letter, the archbishop of Siena, Gae-tano Bonicelli, noted that even after attending catechism classes, 20-year-olds "do not know the difference between the Trinity and the Madonna." Such ignorance of Catholic doctrines is a reflection of what another high-ranking prelate, Cardinal Ratzinger, called "the disaster of the present catechism," reports *Corriere della Sera*, of Milan, Italy. Archbishop Bonicelli recommends a return to evangelization. "The mission, that is evangelization, becomes the only possible response for the church in the third millennium."

Morals on the Rebound?

In China a recent survey revealed that "though Chinese adults have become more tolerant of extramarital sex, most teenagers are still against such behavior," reports the magazine *China Today*. These findings were based on a poll of about 8,000 people. "Three-fifths of the teenagers agreed that people who destroy other people's marriages by having an affair should be punished either financially or by other means," the survey showed, "while 70 percent of people aged between 37 and 45 do not think there should be any punishment for such activities."

Wearing Casual Clothes to Church



In the United States, increasing numbers of people are wearing casual clothes to church, reports the Associated Press. Some ministers find it troubling to see churchgoers wearing shorts, jeans, or other casual clothes to church services. Church officials are in a quandary—they do not want to drive away new members or alienate regular worshipers who don't want to dress up. According to one survey, "about 30 percent of Americans prefer church services that are informal and contemporary," compared with the 21.5 percent who favor more traditional services.

Teenage Pregnancies Accepted

"An important factor in the steady increase in the number of unwed mothers [is] acceptance by society," says *The News*, of Mexico City. "It seems that society is bending over backwards to erase the stigma of unwed teenage pregnancies. In so doing, it might even be going further by encouraging it." Can the increase be reversed? The article states: "If publicity agencies have been able to turn the image of a smoker from one of sophistication to one of degeneration, if America's diet can change from high fat to high fiber, teenagers' ideas can be changed to make having babies in high school appear foolish and counterproductive."

Charting Kindness

"Children are basically self-centred until at least about age 4, when they begin to become developmentally capable of empathy," says a report quoted in *The Toronto Star*. To help children develop concern for others, home training in acts of kindness is suggested. Perhaps family members can record on a chart at least two unsolicited good deeds they perform each day. Parents who observe a kind act by their child can add it to the chart. A number of schools use such charts in an effort to counteract bullying. Students are invited to record acts of kindness that they witness on the part of other children. According to the report, "this helps children recognize compassion, which is a crucial step in learning how to feel and practise it yourself."

FROM OUR READERS

Cruelty to Animals I am writing to tell you what an absolutely wonderful job you did on your article "The Bible's Viewpoint: Cruelty to Animals—Is It Wrong?" (November 8, 1998) I think it is great that you showed that God does not approve of cruelty to animals, especially by those claiming to be Christian.

J. L. C., United States

Youths Without Parents I am deeply grateful for the article "Young People Ask . . . Why Must I Live Without My Parents?" (November 22, 1998) I am now 39 years old. But when I was 11, my mother died and my father left home. Until now I have never been able to get people to understand the miserable lives my brothers and I lived. But now I feel that others understand us. Thank you.

K. Y., Japan

My father died when I was just nine months old, and my mother, before I was 12 years old. Your article was very comforting and showed how orphans really feel. How good it is to know that Jehovah will bring our dead loved ones back to life!

M. S. S., Brazil

I am 40 years old and have read and reread the article. I had tears in my eyes from beginning to end, since I was orphaned when I was two. Until now, I could not look at a picture of Mom and Dad without crying. Thank you for writing such articles!

J. C. V., France

My parents are alive, but I'm manic-depressive (bipolar) and interested in any article that discusses how to get through hard times. I just want to tell you that I love the real-life experiences and Bible-based counsel found in "Young People Ask . . ."

S. H., Canada

Woodworking I have been reading this journal for decades, and it seems that it is constantly improving in content, writing style, and selection of subject material. I do wish to comment, however, on the article "Exploring the Age-Old Beauty of Wood." (November 8, 1998) Please warn readers who may be tempted to try this work that the adz is an extremely dangerous tool. When I was growing up in the 1920's, it was still in use and was commonly known as a foot adz. As shown in your picture, the wood is held between the feet, and the tool is razor sharp. However, it was also called a foot evil because of the many times users injured their feet. I feel it is too dangerous for an untrained person to use.

W. G., United States

We appreciate this cautionary reminder.—ED.

Tactful Queen Your fascinating article about Catherine Parr ("A Tactful Queen Who Defeated a Scheming Bishop," November 8, 1998) reminded me of the Bible account of Queen Esther. What wisdom these women showed! Although I am not one of Jehovah's Witnesses, I never miss an issue of *Awake!* I often wonder why others do not appreciate your literature as I do.

M. D. S. F., Brazil

I found the historical account about Henry VIII and his wife Catherine Parr to be very interesting. My compliments. The article was well-researched, concise, and clear.

C. G., Italy

The way the article was narrated made us feel as if we were experiencing each moment with Queen Catherine. Thank you for printing articles like this so that those of us who live on this side of the world can get to know about faraway cultures.

L. G. and L. G., Venezuela

"Not Everyone Has Been Invited to the Party"

THE Human Development Report 1998, an annual report compiled by the UN Development Programme, or UNDP, focused on the world's unprecedented boom in consumption. It revealed that, globally speaking, we now spend six times as much on economic goods as we did in 1950 and twice as much as we did in 1975. Despite this boom in consumption, UNDP executive director, James Gustave Speth, says: "Not everyone has been invited to the party."

To illustrate: The richest 20 percent of the world population eat seven times as much fish as the poorest 20 percent of the people in the world. The richest 20 percent also consume 11 times as much meat, use 17 times as much energy, have 49 times as many telephone lines, use 77 times as much paper, and possess 149 times as many cars as the poorest 20 percent of the world.

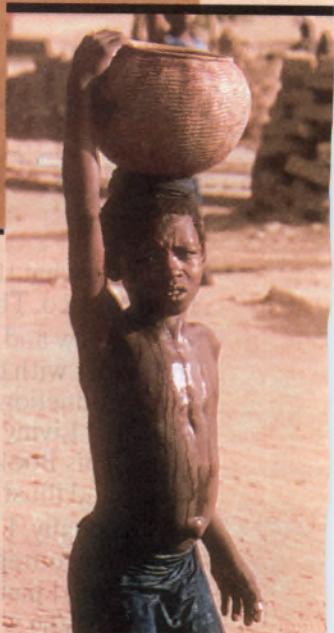
Commenting on these findings, UN Radio noted that in order to slow the decline of the earth's natural resources, the industrialized world needs to change its consumption patterns. At the same time, richer countries need to share more of their wealth with the world's poor so that they can also benefit more from earth's resources. How much wealth sharing would be needed?

Mr. Speth calculates that if the industrialized countries were to double their present level of development assistance—from \$50 billion to \$100 billion a year—all the poor around the world would be able to

enjoy food, health, education, and shelter. Now \$50 billion may sound like a lot of money. But, reminds Mr. Speth: "It's the amount that Europe spends annually on cigarettes, and it's half of what the US spends today on alcoholic beverages."

Clearly, then, a concerted effort to share the resources of this planet more evenly would go a long way in bringing an end to painful poverty. What is needed to make this happen? One UN official observed: "What is required in the final analysis is the transformation of hearts, minds and wills." Most people agree but also realize that today's policy-making organizations, no matter how well-intentioned they may be, are unable to perform such transformations, much less root out qualities like greed.

Nevertheless, for people who are concerned about the future of the human family and of our planet, there is hope. It is heartening to know that the earth's Creator has promised to deal effectively with man's problems. The psalmist foretold: "The earth itself will certainly give its produce; God, our God, will bless us. There will come to be plenty of grain on the earth; on the top of the mountains there will be an overflow." (Psalm 67:6; 72:16) Yes, then each one of earth's inhabitants will be "invited to the party"!

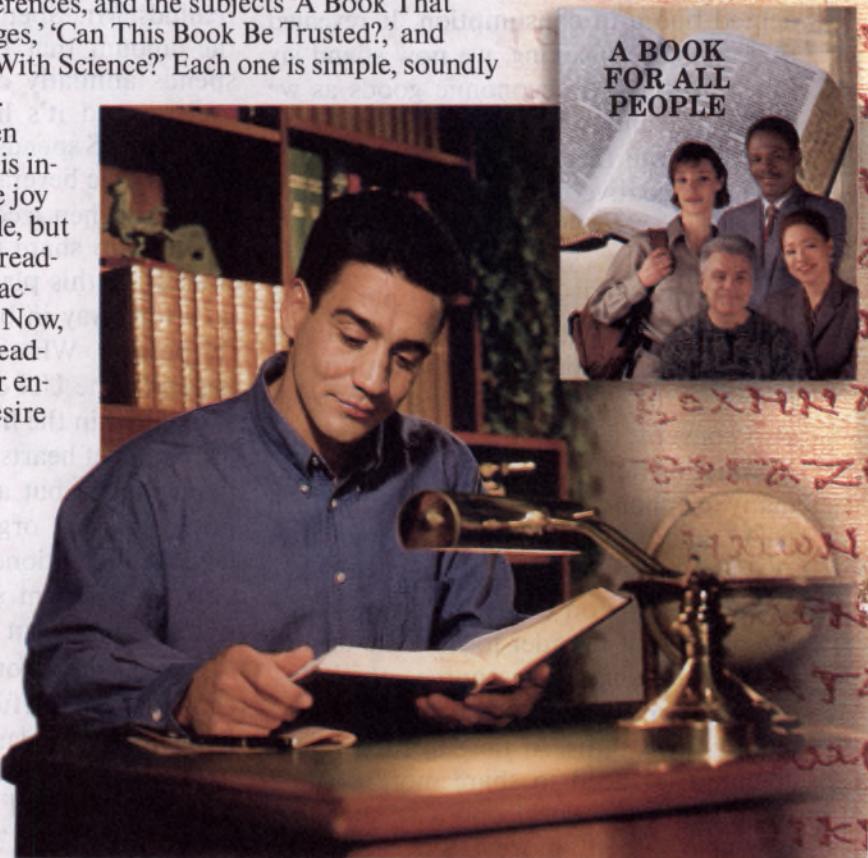


It Encouraged Him to Reread the Bible

That is what the brochure *A Book for All People* did for a man from Mexico. This is what he wrote about the brochure:

"The new and reasonable way the subjects are broached leaves the reader with the desire to read the Bible. . . . I personally enjoyed the introduction, the references, and the subjects 'A Book That 'Speaks' Living Languages,' 'Can This Book Be Trusted?,' and 'Does This Book Agree With Science?' Each one is simple, soundly based, and illustrated. . . .

"Personally, I have been greatly encouraged by this information. I have had the joy of reading the whole Bible, but the first thing I did after reading this brochure was to acquire a large-print Bible. Now, a week thereafter, I am reading the Bible with greater enthusiasm and with the desire to learn more."



The Trustees of the Chester Beatty Library, Dublin ▶