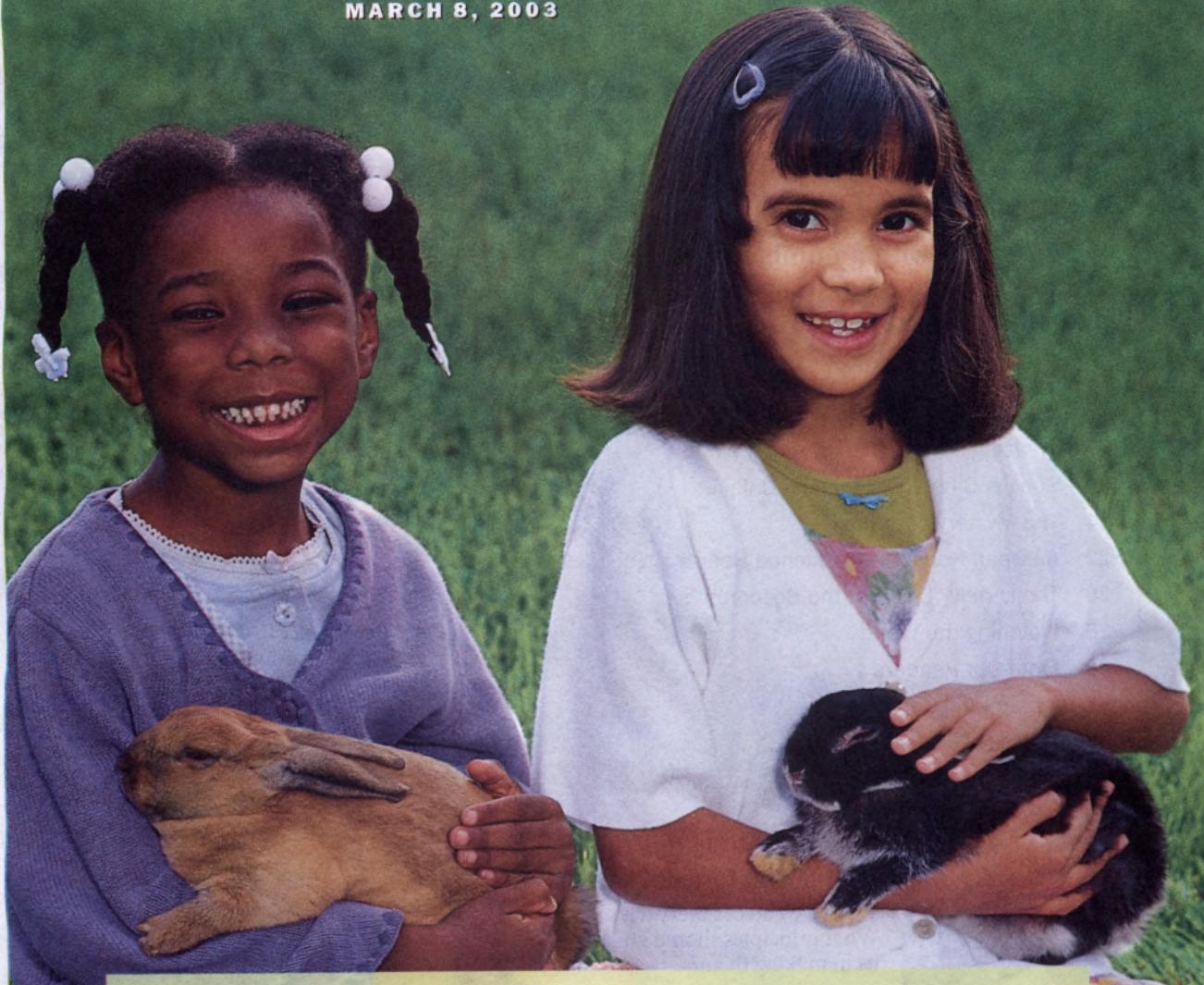


Awake!

MARCH 8, 2003



LIFE'S AMAZING SENSES

Do You Appreciate Them?

LIFE'S AMAZING SENSES—Do You Appreciate Them? 3-11

We are gifted with a number of senses. Do we fully use them to appreciate life and all that is around us?

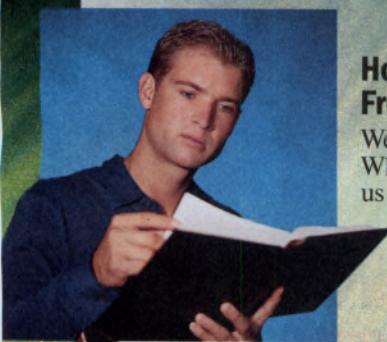
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Finding the right shoe is not a simple matter. Your feet can actually have four different phases of fit.



How Many Senses Do We Really Have?



"We interact with our environments so effectively and so effortlessly, it is difficult to appreciate the extensive computations that underlie even the simplest sensory experience." —SENSORY EXOTICA

—A WORLD BEYOND HUMAN EXPERIENCE.

PICTURE yourself cycling along a quiet country road. As you pedal, sensors in your legs enable you to apply just the right pressure to maintain your speed. Your organs of balance keep you upright; your nostrils smell the aromas; your eyes absorb the panorama; your ears are attuned to the chirping of birds. Thirsty, you grasp your drink bottle, aided by touch receptors in your fingers. Your taste buds and hot-and-cold sensors reveal the flavor of the liquid and its temperature. Sensors in your skin and those attached to your body hair tell how strong the breeze is and, in cooperation with your eyes, how fast you are going. Your skin also informs you of the ambient temperature and humidity, while your awareness of time tells you approximately how long you have been on the road. Eventually, internal senses will compel you to rest and to eat. Yes, life truly is a superb symphony of the senses!

Just Five Senses?

During such a bicycle ride, how many senses come into play —just the traditional five: sight, hearing, smell, taste, and touch? According to the *Encyclopædia Britannica*, these five senses were enumerated by the ancient philosopher Aristotle, whose “influence has been so enduring that many people still speak of the five senses as if there were no others.”

However, according to *Britannica*, studies in skin sensitivity alone “yield evidence that the human senses number more than five.” How can that be? Certain functions once lumped together under touch are now regarded as senses in their own right. For instance, pain receptors respond to and distinguish between mechanical, thermal, and chemical forces

Eye: *The Complete Encyclopedia of Illustration*/J. G. Heck; ear and inner ear: © 1997 Visual Language; hand: *The Anatomy of Humane Bodies*, with figures drawn after the life by some of the best masters in Europe . . . Oxford, 1698, William Cowper

The Wonder of Human Touch

The human hand has a particularly refined sense of touch. According to *Smithsonian* magazine, researchers found that our hand can detect a dot just three microns high. (A human hair has a diameter of 50 to 100 microns.)

However, by "using a texture rather than a dot, the researchers found the hand can detect roughness just 75 nanometers high"—a nanometer being one thousandth of a micron! Such remarkable sensitivity is attributed to about 2,000 touch receptors in each fingertip.

Our sense of touch also plays a key role in our health and well-being. "The caress of another person releases hormones that can ease pain and clear the mind," says *U.S. News & World Report*.

Some believe that when a child is deprived of the loving touch of others, its growth will be impeded.



or agents. Other sensors signal an itch. Evidence suggests that we have at least two kinds of pressure sensors—one for light surface pressure, another for deep stimulation. Our body also has a broad range of internal senses. What is their role?

The Internal Senses

Internal senses detect changes taking place inside our body. They signal things like hunger, thirst, fatigue, internal pain, and the need to breathe or to go to the toilet. In cooperation with our biological clock, internal sensors make us feel tired at day's end and jet-lagged if we have flown across time zones. In fact, because we can consciously "sense" the flow of time, it has been suggested that time awareness be added to the catalog of senses.

We also have a *vestibular* sense, or sense of balance, which is located in our inner ear. It responds to gravity, acceleration, and rotation. And finally we have a *kinesthetic* sense, which enables us to detect muscle tension and, even with eyes closed, the movement and position of our limbs.

Of course, sensory perception is not unique to humans. Animals also possess a broad variety of senses, including some truly astonishing ones that we do not have. In the following article, we will examine some of these. We will also take a closer look at ourselves and the unique attributes that give humans a special place among earth's living things.

Awake!

THIS JOURNAL IS PUBLISHED 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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Amazing Senses in the Animal World

SCAMPERING about looking for food, the mouse feels safe in the darkness. But it does not anticipate the pit viper's ability to "see" the heat radiating from the mouse's warm body—a fatal misjudgment. A flounder lies completely concealed under a layer of sand in a shark pool, where a hungry shark is cruising in its general direction. The shark cannot see the flounder; yet, in the blink of an eye, the shark stops, plunges its nose into the sand, and devours its quarry.

Yes, the pit viper and the shark are examples of animals with specialized senses that humans do not have. On the other hand, many creatures have senses that are like our own but are more acute or able to capture a different range of perception. Eyes are a good example of this.

Eyes That See a Different World

The range of colors our eyes capture is but a minute fraction of the electromagnetic spectrum. For instance, our eyes cannot see infrared radiation, which has a longer wavelength than red light. However, pit vipers have two small organs, or pits, between their eyes and nostrils that detect infrared radiation.*

* There are about 100 species of pit vipers, including copperheads, rattlesnakes, and water moccasons.

Hence, even in the dark they can accurately strike at warm-blooded prey.

Beyond the violet end of the visible spectrum is ultraviolet (UV) light. Although unseen to our eyes, UV light is visible to many creatures, including birds and insects. Bees, for instance, orient themselves in relation to the sun—even on a partly cloudy day when it is hidden—by locating some blue sky and seeing the pattern formed by polarized UV light. Many flowering plants present patterns visible only in the UV range, and some flowers even have a "nectar marker"—a section with a contrasting UV reflectance—to point insects to the nectar. Certain fruits and seeds advertise themselves to birds in a similar way.

Because birds see in the UV range and because this light gives their plumage extra radiance, birds probably look more colorful to one another than to us. They have a visual "depth of richness that we can't begin to imagine," said one ornithologist. The ability to see UV light may even help certain hawks and kestrels to locate voles, or field mice. How so? Male voles, says the journal *BioScience*, "produce urine and feces containing chemicals that absorb UV, and mark their trails with urine." Thus, birds can "identify areas of high vole density" and focus their efforts there.

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Why Do Birds See So Well?

Bird vision is a marvel. "The chief reason," says the book *All the Birds of the Bible*, "is that the image-forming tissue lining the eye's interior is richer in visual cells than the eye of other creatures. The number of visual cells determines the ability of the eye to see small objects at a distance. While the retina of a man's eye contains some 200,000 visual cells per square millimeter, most birds have three times that number, and hawks, vultures, and eagles have a million or more per square millimeter." Additionally, some birds have the extra asset of two foveae—areas of maximum optical resolution—per eye, giving them a superior perception of distance and speed. Birds that catch flying insects are similarly endowed.

Birds also have an unusually soft lens that enables rapid focus. Imagine how dangerous life on the wing would be—especially in forests and thickets—if everything were a blur. Yes, what wisdom is manifest in the design of the avian eye!*

The Electric Sense

The scenario mentioned earlier involving the hidden flounder and the shark actually occurred during a scientific study of sharks. The researchers wanted to know if sharks and rays sensed the minute electric fields that emanate from living fish.[#] To find out, they hid electrodes in the sandy floor of the shark pool and applied the appropriate voltage. The result? As soon as the shark neared the electrodes, it viciously attacked them.

Sharks possess what is called *passive* electroreception; they sense electric fields just as the ear passively hears sound. But electric fish have *active* electroreception. Like a bat that emits an acoustic signal and reads the echo, these fish emit electric waves or pulses, depending on the species, and then, with spe-

* Readers interested in the question of evolution versus intelligent design are invited to read the book *Life—How Did It Get Here? By Evolution or by Creation?*, published by Jehovah's Witnesses.

[#] When submerged in water, all living creatures, humans included, project a minute, but detectable, electric field.

cial receptors, detect any disturbances made to these fields.* Thus electric fish can identify obstacles, potential prey, or even a mate.

A Built-in Compass

Think what life would be like if your body were equipped with a built-in compass. Getting lost would surely not be a problem! Within the body of a number of creatures, including honeybees and trout, scientists have found microscopic crystals of magnetite, or lodestone, a natural magnetic substance. The cells containing these crystals are connected to the nervous system. Hence, bees and trout have demonstrated the ability to detect magnetic fields. In fact, bees use the earth's magnetic field for comb building and navigation.

Investigators have also discovered magnetite in a species of bacteria that live in seafloor sediment. When the sediment is stirred up, the earth's magnetic field acts on the magnetite to align the bacteria in such a way that they propel themselves safely back into their seafloor home. Otherwise, they would die.

Many migratory animals—including birds, turtles, salmon, and whales—may also have a magnetic sense. However, they do not seem to rely on this sense alone but, rather, appear to navigate by a variety of senses. Salmon, for instance, probably use their strong sense of smell to find the stream of their birth. European starlings navigate by the sun; and some other birds, the stars. But as professor of psychology Howard C. Hughes observed in his book *Sensory Exotica—A World Beyond Human Experience*, "we are obviously a long way from understanding these and other mysteries of nature."

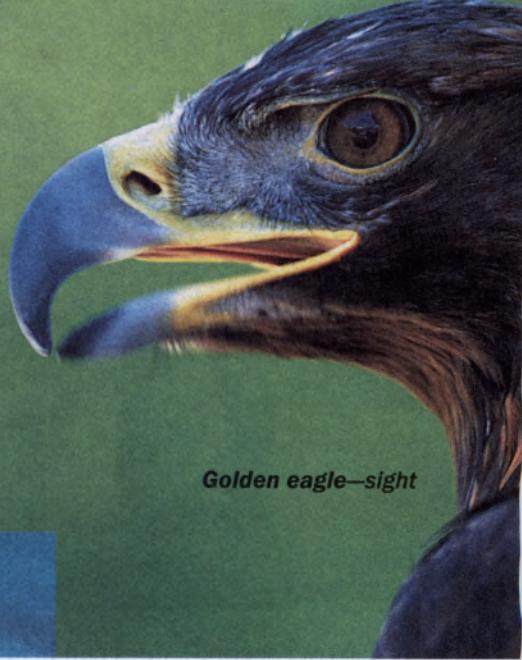
Ears to Envy

Compared with humans, many creatures possess amazing hearing. Whereas we can hear sounds ranging from 20 to 20,000 hertz

* The electric fish we are referring to here produce only a minute charge. They are not to be confused with electric fish that produce much higher voltages, such as electric rays and eels, which stun either in defense or in the capture of prey. Electric eels can even kill a horse!



Honeybees—sight and magnetic sense



Golden eagle—sight



Ray—electric sense



Shark—electric sense

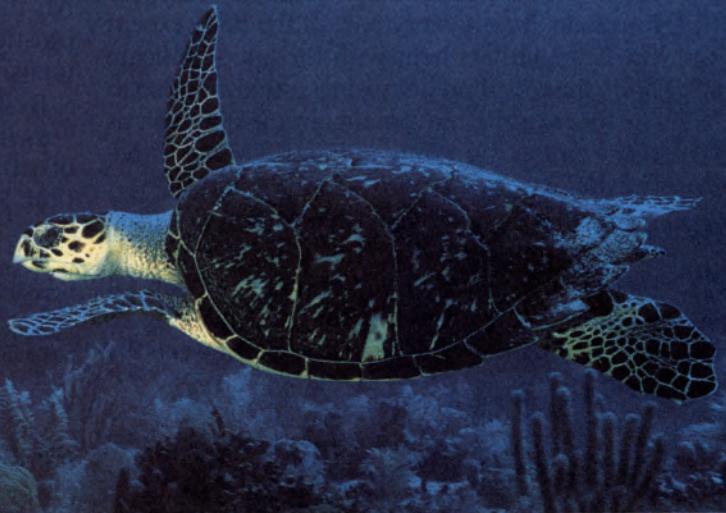


Starlings—sight

U.S. Fish & Wildlife Service, Washington, D.C.



Salmon—smell



Elephant—low-frequency hearing



Dog—high-frequency hearing

(cycles per second), dogs can hear in the range of 40 to 46,000 hertz, and horses, between 31 and 40,000 hertz. Elephants and cattle can even hear in the infrasonic range (just below human hearing) to as low as 16 hertz. Because low frequencies travel farther, elephants may be able to communicate over distances of two or more miles. In fact, some researchers say that we could employ such animals to give us an early warning of earthquakes and severe weather disturbances—both of which emit infrasonic sound.

Insects also have a wide range of hearing, some in the ultrasonic range over two octaves above the human ear and others in the infrasonic range. A few insects hear by means of thin, flat, eardrumlike membranes, which are found on almost every part of the body except the head. Others hear with the aid of delicate hairs that respond not just to sound but also to the most gentle movements in the air, such as those caused by a human hand. This sensitivity explains why flies are so hard to swat!

Imagine being able to hear an insect's footsteps! Such amazing hearing belongs to the world's only flying mammal—the bat. Of course, bats require specialized hearing to navigate in the dark and to catch insects by

means of echolocation, or sonar.* Says Professor Hughes: "Imagine a sonar system more sophisticated than that found in our most advanced submarines. Now imagine that system is used by a small bat that easily fits in the palm of your hand. All the computations that permit the bat to identify the distance, the speed, and even the particular species of insect target are performed by a brain that is smaller than your thumbnail!"

Because precise echolocation also depends on the quality of the sound signal emitted, bats have the "ability to control the pitch of their voice in ways that would be the envy of any opera singer," says one reference.[#] Apparently by means of the flaps of skin on the noses of some species, bats can also focus sound into a beam. All these assets contribute to a sonar so sophisticated that it can produce an "acoustic image" of objects as fine as a human hair!

Besides bats, at least two kinds of birds—swiftlets of Asia and Australia and oilbirds of tropical America—also employ echolocation. However, it seems that they use this abil-

* The bat family comprises about 1,000 species. Contrary to the popular view, all have good eyes, but not all use echolocation. Some, like fruit bats, use their excellent night vision to find food.

[#] Bats emit a complex signal with a number of frequency components ranging from 20,000 to 120,000 hertz or higher.

Dolphins—sonar



ity simply to navigate in the dark caves where they roost.

Sonar at Sea

Toothed whales also employ sonar, although scientists have yet to discover exactly how this works. Dolphin sonar begins with distinct clicks, which are believed to originate, not in the larynx, but in the nasal system. The melon—the bulb of fatty tissue on a dolphin's forehead—focuses the sound into a beam that "illuminates" a zone in front of the animal. How do dolphins hear their echoes? Not with

their ears, it seems, but with their lower jaw and associated organs, which connect to the middle ear. Significantly, this region contains the same kind of fat as that found in the dolphin's melon.

Dolphin sonar clicks are strikingly similar to a mathematical waveform called a Gabor function. This function, says Hughes, proves that dolphin clicks "approach a mathematically idealized sonar signal."

Dolphins can adjust the power of their sonar clicks from a mere whisper to a



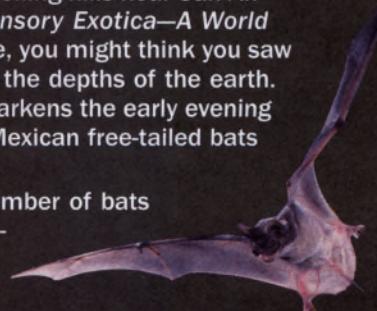
Bracken Cave

Courtesy Lise Hogan

they pursue their favorite meal, insects. Although the night sky must contain an overabundance of ultrasonic bat calls, there is no confusion, for each of these unique mammals is equipped with a highly sophisticated system for detecting its own echoes.

Insects Beware! "Each day, just around dusk, a truly astonishing event takes place under the rolling hills near San Antonio, Texas [U.S.A.]," says the book *Sensory Exotica—A World Beyond Human Experience*. "At a distance, you might think you saw an enormous black cloud billowing from the depths of the earth. However, it's not a cloud of smoke that darkens the early evening sky, but the mass exodus of 20 million Mexican free-tailed bats from the depths of Bracken Cave."

A more recent estimate places the number of bats exiting Bracken Cave at 60 million. Climbing up to 10,000 feet into the night sky,



Mexican free-tailed bat—sonar

© Merlin D. Tuttle, Bat Conservation International, Inc.

A close-up photograph of a woman with dark skin and curly hair, wearing a yellow ribbed sweater. She is looking down and to her right, holding a small red flower up to her nose to smell it. In the foreground, there are several other flowers, including yellow and red ones, partially out of focus.

cracking 220 decibels. How powerful is that? Well, loud rock music can produce 120 decibels, and artillery fire 130 decibels. Armed with sonar that is much more powerful, dolphins can

detect things as small as a three-inch ball 400 feet away and possibly even farther in quiet waters.

When you reflect on the amazing senses manifest in the living world, does it not fill you with awe and wonder? Humble, informed people usually feel that way—which brings us back to the question of how we are made. True, our senses often pale beside those of certain animals and insects. Nevertheless, we alone are *moved* by what we observe in nature. Why do we have such feelings? And why do we seek not just to understand living things but to comprehend their purpose and to learn our own place among them?

Special Gifts That Make Us Unique

'The scientist studies nature because he delights in it, and he delights in it because it is beautiful.' —JULES-HENRI POINCARÉ,
FRENCH SCIENTIST AND MATHEMATICIAN (1854-1912).

POINCARÉ deeply admired the beauty of the natural world, particularly "that profounder beauty" of harmony and order that appeals to the scientific mind. However, one need not be a scientist to appreciate the beauty and order around us. Some 3,000 years ago, the psalmist David was greatly moved by the design manifest in creation—especially the

Use your senses to build appreciation for the Creator

design of the human body. Hence, he prayed: “I shall laud you because in a fear-inspiring way I am wonderfully made. Your works are wonderful, as my soul is very well aware.”—Psalm 139:14.

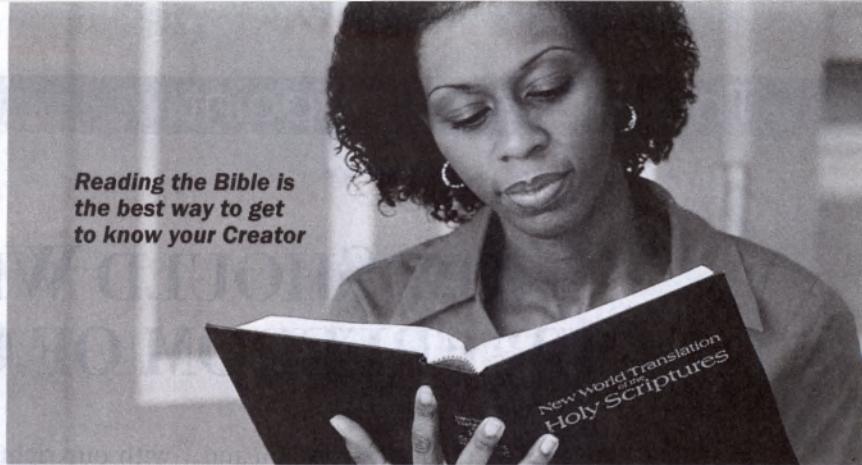
Such feelings of wonder and reverence are uniquely human, beyond the capacity of even the most intelligent animal. Yet, our interest in the natural world goes deeper still. Thoughtful people of all ages have asked: What is the source of the amazing design of living things? Indeed, why do living things exist to begin with? And what is our place in the scheme of things? Science and introspective reasoning cannot answer these questions. But the Bible, which is inspired by God, does provide truly satisfying answers.—2 Peter 1:20, 21.

This ancient sacred book explains that our unique human traits are the result of our being created “in God’s image”—meaning that we are capable of reflecting (albeit to a lesser degree) our Creator’s personality traits. (Genesis 1:27) So although we do not have the eyes of an eagle, we can display farsighted wisdom. Our hearing may pale in comparison with that of a bat, but we delight in conversation, music, and the pleasant sounds of nature. And while we lack an internal compass, by turning to God’s Word, the Holy Bible, we get the very best guidance for life.—Proverbs 3:5, 6.

Our being created in God’s image also explains why we alone have a spiritual need. “Man must live, not on bread alone,” Jesus said, “but on every utterance coming forth through Jehovah’s mouth.” (Matthew 4:4) Do you regularly take in those refreshing utterances by reading the Bible?

When properly nurtured by God’s Word, our spirituality can expand our perceptions beyond the limits imposed by our physical senses. How so? By building up our faith. Gen-

*Reading the Bible is
the best way to get
to know your Creator*



uine Bible-based faith enables us to “see” the invisible God—as did Moses—and also to discern His purpose for the future.—Hebrews 11:1, 27.

A Glorious Future for Those Who “See” God

The Bible teaches that the Creator, Jehovah God, loves the earth and all its living creatures, especially God-fearing humans. Hence, he promises to bring an end to all the wicked, including those who are greedily “ruining the earth.” (Revelation 11:18; Psalm 37:10, 11; 2 Thessalonians 1:8) Thereafter, he will grant eternal life to people who love and obey him. What is more, they will help turn the entire planet into a paradise bursting with life. What a wonderful prospect!—Luke 23:43.

Imagine what you will be able to do and discover when life and good health are unlimited! “Nature,” wrote one scientist, “will always have novelty, richness, and beauty that can never be exhausted.” The Bible puts it this way: “Everything [God] has made pretty in its time. Even time indefinite he has put in their heart, that mankind may never find out the work that the true God has made from the start to the finish.”—Ecclesiastes 3:11.

How can you be part of the Paradise described in the Bible? By learning about God’s purpose now and by acting on what you learn. “This means everlasting life,” Jesus said, “their taking in knowledge of you, the only true God, and of the one whom you sent forth, Jesus Christ.”—John 17:3.

HOW SHOULD WE USE OUR FREEDOM OF CHOICE?

GOD endowed the first humans, Adam and Eve, with the ability to make their own choices. He put Adam in charge of the garden of Eden. Adam's duties included selecting names for the animals. (Genesis 2:15, 19) More important, Adam and Eve could decide whether to obey God or not.—Genesis 2:17, 18.

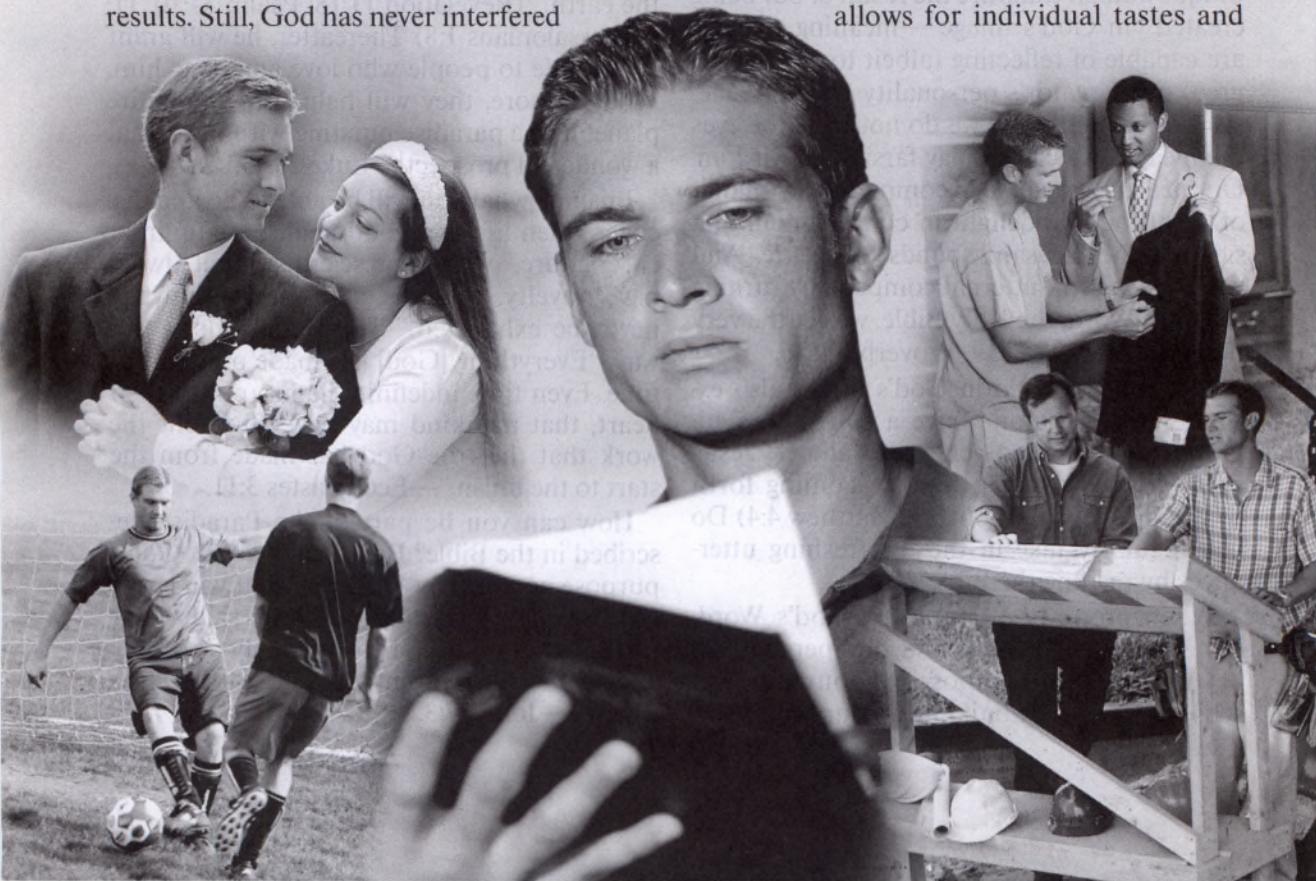
Since then, people have made countless billions of decisions—many of them good, some unfortunate, and others totally evil. Some of man's bad choices have yielded disastrous results. Still, God has never interfered

with our right to choose. As a loving Father, God provides us with help in making good decisions through the pages of the Bible. He also warns us about the consequences of making wrong choices. The Bible says that we will reap what we sow.—Galatians 6:7.

Decisions in Personal Matters

On some matters God clearly expresses his will, providing us with specific direction. On most matters, however, the Bible does not set rules to govern all of our personal affairs.

Instead, it gives broad guidance that allows for individual tastes and



desires. For example, notice what it says about recreation.

The Scriptures call Jehovah “the happy God.” (1 Timothy 1:11) His Word speaks of “a time to laugh” and “a time to skip about.” (Ecclesiastes 3:1, 4) The Bible tells us that King David played music for the benefit of others. (1 Samuel 16:16-18, 23) Jesus attended a wedding feast, and he added to the occasion by changing water into wine.—John 2:1-10.

However, the Bible aptly warns: “He that is walking with wise persons will become wise, but he that is having dealings with the stupid ones will fare badly.” (Proverbs 13:20) “Obscene jesting” and immoral activities offend God and can ruin our relationship with him. (Ephesians 5:3-5) When alcohol flows without proper restraint at social events, serious problems can result. (Proverbs 23:29-35; Isaiah 5:11, 12) Jehovah God also hates violence.—Psalm 11:5; Proverbs 3:31.

These Bible verses help us to see recreation as God does. In making choices, Christians take the Bible into consideration. Of course, all of us will face the good or bad consequences of our own choices.—Galatians 6:7-10.

In a similar fashion, Christians are encouraged to make wise decisions in line with Bible principles in such matters as clothing, marriage, parenthood, and business dealings. These include matters not specifically mentioned in the Scriptures, yet principles found therein help them to make decisions based on conscience. (Romans 2:14, 15) The following standard should apply in all personal decisions made by Christians: “Whether you are eating or drinking or doing anything else, do all things for God’s glory.”—1 Corinthians 10:31.

On this subject we also do well to consider the principle of ‘minding our own business.’ (1 Thessalonians 4:11) Christians are often confronted with several choices that do not conflict with God’s will. Hence, the preference of one Christian may differ from that of others. It would displease God to see his servants judging one another. (James 4:11, 12) The

Bible wisely counsels: “Let none of you suffer . . . as a busybody in other people’s matters.”—1 Peter 4:15.

The Decision to Serve God

The Bible highlights the benefits of obedience to God. Still, God does not coerce people into worshiping him. Rather, he invites his human creatures to become his worshipers. For instance, the Bible says: “O come in, let us worship and bow down; let us kneel before Jehovah our Maker.”—Psalm 95:6.

Such an invitation was given to ancient Israel. Over 3,500 years ago, the nation of Israel stood before Mount Sinai, and God introduced those millions of people to the system of true religion embodied in the Mosaic Law. They now had a choice to make: Would they serve God or not? How did they respond? Unitedly they said: “All that Jehovah has spoken we are willing to do and be obedient.” (Exodus 24:7) The decision to worship Jehovah was their own.

In the first century, Jesus initiated the preaching of the good news of God’s Kingdom. (Matthew 4:17; 24:14) He never coerced anyone to join in this work. Rather, he kindly invited others, saying: “Come be my follower.” (Mark 2:14; 10:21) Many accepted his invitation and began preaching with him. (Luke 10:1-9) After a time, some chose to leave Jesus. Judas chose to betray him. (John 6:66; Acts 1:25) Later, under apostolic guidance, many more individuals became disciples, not at the point of a sword, but by use of their free will. They were “rightly disposed” and “became believers.” (Acts 13:48; 17:34) Today, too, true Christians willingly obey God’s Word and follow the teachings of Jesus.

Clearly, God desires that we use our ability to make choices. He also provides guidance in the Bible that helps us to make wise decisions. (Psalm 25:12) In the realm of personal decisions, each Christian should carefully consider godly principles. Only in that way can we render to God ‘sacred service with our power of reason.’—Romans 12:1.

THE MYSTERY OF

WHEN you think of historic cities, which ones come to mind? Rome, London, Paris? What about Cahokia? ‘Cahokia?’ you might ask. Yes, Cahokia—located in Illinois, eight miles east of St. Louis, Missouri, U.S.A.* Large, sophisticated, and well planned, it ranked as an outstanding American Indian city for 500 years. At the height of its civilization, about 1150 C.E., Cahokia was bigger than either London or Rome of that time.

Encompassing more than five square miles, according to one source, Cahokia “was unquestionably the largest prehistoric urban center north of Mexico.” (*Encyclopedia of North American Indians*) In addition, all along the Mississippi River valley are the remains of earthen mounds—silent reminders that a thriving civilization once existed here. In fact, St. Louis itself was nicknamed Mound City

* The name Cahokia was given to the site during the 1800's. Some believe that the word means “city of the sun.” Other experts believe it means “wild geese.” There are no written records to indicate what the local people called themselves or their city.

before urban expansion overwhelmed the 26 mounds within its borders.

A Protected Historic Site

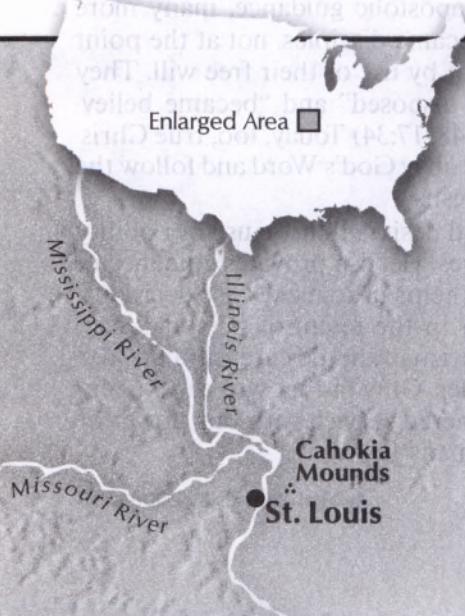
Some Native Americans regard Cahokia as a starting point from which many tribes can trace their origin. The book *The Native Americans* states that “descendants of the mound-building Mississippians became the Chickasaws, the Seminoles, and the Choctaws.” Another source says that they were the ancestors of the Creek, the Cherokee, the Natchez, and others.

Originally, Cahokia included 120 earthen mounds. But now, after many years of farming and urban expansion in the area, only 80 remain. Of these, 68 lie within the boundaries of the present 2,200-acre site.

Since 1925, Cahokia has been protected as an Illinois State Historic Site. And in 1982 the United Nations Educational, Scientific, and Cultural Organization designated Cahokia Mounds as a World Heritage site because of its importance in understanding the early history of North America.

HOW DID CAHOKIA GET ITS START?

There is much speculation about the origin of the Cahokia civilization, and experts disagree on the answer. Francis Jennings, director emeritus of the Newberry Library Center for the History of the American Indian, is convinced that early colonists from Mesoamerica brought their maize and their architecture to the Mississippi Valley. He writes: “The colonists established apparent commercial superiority over indigenous tribes in the Mississippi Valley on a scale that looks on the map very like an empire. They brought from Mesoamerica the habit of building truncated pyramids and of putting



CAHOKIA

Why Here?

As early as 700 C.E., the area around Cahokia was inhabited by Indians of the Late Woodland culture. However, the mounds were not built until about 200 years later. Why was Cahokia built here? For the same reasons that St. Louis was built nearby. The site is close to the intersections of three major rivers—the Mississippi, the Missouri, and the Illinois—on the fertile river floodplain that geologists call the American Bottom.

The rivers and their tributaries were filled with fish and migrating waterfowl. The surrounding woodlands provided not only lumber but also game, especially white-tailed deer—a primary source of meat. Other resources, such as basalt, red ochre, galena, and granite, came from the nearby Ozark Plateau. And the neighboring prairies provided plenty of tall grasses for use in building homes and other structures for a peak population of perhaps 20,000 or



The Cahokia Birdman Tablet

more. The floodplain itself produced an abundance of crops, including corn, amaranth, pumpkins, squashes, and sunflowers. The Cahokians could also gather pecans, hickory nuts, blackberries, and wild plums. Moreover, the rivers allowed them to carry on extensive trade in all directions. Seashells from the Gulf of Mexico, copper from the North American Great Lakes region, and mica from the Appalachian Mountains have all been discovered at Cahokia.

The Life and Beliefs of the Cahokians

In the visitor center at the site is a life-size display depicting typical daily activities in Cahokia, including skinning deer and grinding corn. Knowledge of corn cultivation, combined with access to other natural resources, was the cornerstone of Cahokia's civilization.

One archaeologist described Cahokia as "a North American Jerusalem," since religion appears to have permeated every aspect of its

temples and administrative structures on the top-most platforms."

However, Jennings admits that much remains uncertain. "Archaeologists dispute whether the Mississippians in fact were colonists from Mexico, and they dither a lot on the issue while failing to offer a credible alternative."

George E. Stuart, in his book *Ancient Pioneers—The First Americans*, states: "To many archaeologists and art historians, the platform mounds, carefully arranged around plazas," and some of the pottery "demonstrate clear influences,

perhaps indirect, from Mesoamerica—as do the strains of maize and beans present at the sites." However, a seed of doubt is sown with his words, "no single artifact of undisputed Mesoamerican manufacture has ever been found in the Southeast." Thus, the mystery remains—who influenced the inhabitants of Cahokia? Was it colonists from Mesoamerica? Time and archaeology might one day supply an answer.

Arrowpoints and stones from Mound 72



society. Another source says that "at its peak (A.D. 1000-1150) Cahokia was home to a highly centralized theocracy." Artifacts discovered here indicate that in the Cahokian's view, religion and society were inseparable. According to the book *Cahokia—City of the Sun*, "their world was one of opposing forces—dark and light, order and anarchy, good that was rewarded and evil that was punished."

The Cahokians believed in an afterlife. Thus, the dead were buried with honor and often with elaborate ritual, especially among the elite. Some of their mounds were tombs and

may have played a role similar to that of the pyramids of the Egyptian Pharaohs.

A Tour of the Mounds

Let us take a closer look at the mounds. Though they vary in size and shape, all are made of earth, which was transported in baskets to the mound construction sites. It is estimated that, in all, some 50 million cubic feet of soil was moved in this manner!

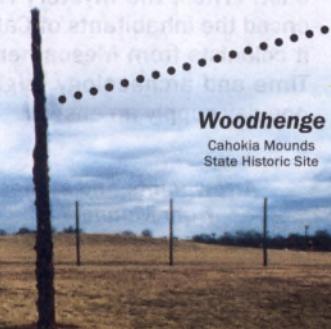
There are three types of mounds: *linear ridgetop* mounds, which may have served as location markers, although some contain graves; *conical* mounds, which may also have been used

CAHOKIA'S ASTRONOMY CENTER

Another unique feature of Cahokia is a series of "perfect circles where massive, evenly spaced posts once protruded from the flats." (*National Geographic* magazine, December 1972) These have been called woodhenges because of their similarity to the ancient stone solar calendar at Stonehenge in England.

One woodhenge has been restored. It is a circle, 410 feet in diameter, of 48 enormous red-cedar posts and is thought by some to have served as a solar observatory. The posts are "aligned with the points of the compass, and so arranged that a forty-ninth post outside the circle permitted an observer within to view the sunrise at the equinoxes and solstices in A.D. 1000."

Archaeologists have been able to define the purpose of only three of the posts. One post marks the equinoxes, the first day of spring and of fall, when the sun rises at the same location. The other two mark the first sunrise of the winter solstice and of the summer solstice. The purpose of the other posts is not yet known.



Woodhenge
Cahokia Mounds
State Historic Site



Greeting the rising sun

Artist's conception of Cahokia as it may have appeared about 1200 C.E. At its height, the city had approximately 20,000 residents

- | | |
|------------------|------------------|
| 1. Monks Mound | 3. Twin Mounds |
| 2. Central plaza | 4. Stockade wall |

Cahokia Mounds State Historic Site/William R. Isenminger



Linear ridgetop mound

Conical mound

Platform mound

for burial; and *platform mounds*, which range in height from a few feet to a hundred feet and served as a base for constructing buildings. Platform mounds were often topped with temples, council lodges, or the dwellings of members of the elite.

Our first stop, designated Mound 72, was built on top of three smaller burial mounds. It is 140 feet long, 72 feet wide, and barely 6 feet high. As mounds go, it is not very large, but it

has yielded an incredible cache of valuable artifacts that shed light on Cahokia. The mound contained the tomb of one man who may have been a prominent leader, judging by the nearly 20,000 Gulf Coast shell beads that were laid out beneath him. In addition, grave offerings, including 800 arrowpoints, 15 concave stones used to play Indian games, a large pile of mica, and a roll of copper, were buried with him. Also, about 300 other people, mostly young

Middle three paintings: Cahokia Mounds State Historic Site/Michael Hampshire



A Cahokia market



Community activities





Cahokia Mounds Interpretive Center

Pictures above and below: Cahokia Mounds State Historic Site

women, were entombed here—many possibly as human sacrifices.

Monks Mound—Why So Special?

Now let us head north across Cahokia's central plaza toward Monks Mound, named after the Trappist monks who lived nearby in the early 1800's and actually gardened on the mound. It is the largest mound at Cahokia and is shaped like a truncated pyramid but with four terraces at various levels. It was built in as many as 14 stages, and it is believed that the construction took place between 900 and 1200 C.E. The mound's base covers more than 14 acres, "larger than that of any pyramid in Egypt or Mexico." The mound rises to a height of 100 feet and is over 1,000 feet long, making it the largest pre-Columbian earthen construction in the Western Hemisphere. On the south side of Monks Mound is a long ramp leading up to the flat terraces. Excavations suggest that there were stairs on this ramp.

No commoner would have been allowed to ascend to the top of these stairs. At the summit stood a large building—the dwelling place of Cahokia's ruler, a chieftain known as the

Great Sun. "There, the chief and his priests probably performed religious rituals and administrative duties, surveyed their domain, and greeted emissaries from the hinterlands," states *Cahokia—City of the Sun*. From this vantage point, the chief could also keep an eye on the various communal structures below, including council lodges, granaries, buildings for food storage, sweat lodges, charnels, and the citizens' dwellings.

The chief could also monitor the stockade that encircled the city, with its numerous lookout towers. The two-mile-long stockade wall was rebuilt three times, each rebuilding requiring as many as 20,000 trees. Some archaeologists believe that it served as a social barrier. But likely it was also built for defense. Who the Cahokians' enemies may have been, however, is a mystery.

What Happened to the Cahokians?

Another mystery also remains. By 1500 C.E., Cahokia had been abandoned. What happened? Theories abound. Evidence unearthed so far does not show signs of any epidemic, invasion, or natural disaster. Perhaps a combination of factors, including climatic change and deforestation, brought drought, hunger, and social upheaval.

Some scientists believe that Cahokia may have suffered from many of the same social ills that plague modern cities—pollution, over-crowding, inadequate waste disposal, and perhaps even civil strife. But not having the Cahokians present to describe their way of life, we are left with many unsolved mysteries.

Monks Mound



Are Your SHOES Really Comfortable?

"No one knows where the shoe pinches like the wearer."

—ATTRIBUTED TO A ROMAN SAGE

WHEN was the last time you bought a pair of shoes? How did they fit you? Were they comfortable? How long did it take you to choose them? How helpful was the shop assistant or fitter? Did you buy them for style rather than comfort? How do they feel now that you have worn them a while? Do they pinch you anywhere?

Buying shoes is not as simple as it sounds. And getting the right size is almost like stepping into a labyrinth. Why is that?

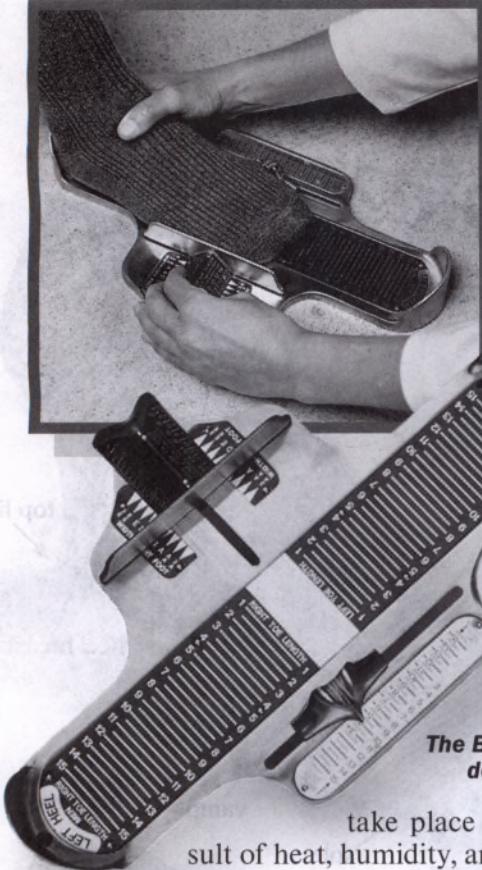
Getting the Right Fit

First of all, which is your larger foot—right or left? You think they are both the same? Think again! Another factor to take into account is that each foot has four phases of fit: static fit, weight-bearing fit, functional fit, and thermal fit. What are the differences?

Regarding static fit, the book *Professional Shoe Fitting* says: "This is the fit of the shoe with the foot at rest (the customer seated)." As the expression "weight-bearing fit" suggests, it is measured when the person is standing. This position changes the size and shape of the foot. The above-quoted reference states: "The foot at rest is essentially a loose bag of bones and gristle that suddenly 'solidifies' on weightbearing, becoming a foot of different fit requirements." But there are two more fits.

The functional fit is the fit under dynamic conditions—when walking, running, jumping, or doing other exercise. This "creates a foot of different combinations of size, shape and proportions." The fourth fit is the thermal, which refers to the alterations that





The Brannock device

take place as a result of heat, humidity, and moisture. These can cause an increase of 5 percent in foot volume. Little wonder that it is a relief to take your shoes off at the end of the day, especially if you are wearing the wrong size! And often that is the case.

How Are Your Feet Measured?

For years Eric had been buying shoes sized 10 and a half or 11, medium width. During that same period, he was constantly bothered by both a corn on a hammertoe and an ingrown toenail on the left big toe. His podiatrist suggested that he have his feet measured by a professional shoe fitter. To Eric's amazement, for comfort his size should have been 12 and a half, A width! "A" indicates a narrow foot. But are two linear measurements, length and width, enough to ensure a comfortable fit? How should you measure your feet?

A popular tool in some countries for assessing size is the Brannock device. (See photo.)

This can be used to obtain three basic measurements: the overall length of the foot, the distance from the heel to the ball joint, and the ball width. But, of course, each foot has its own shape and volume. For that obvious reason, we try shoes on before we buy them. Herein can lie a trap. Have you ever had the experience of trying on shoes that you really like, only to find that they pinch slightly? "The shoes will stretch," says the salesman. You buy them and begin to regret it a few days or weeks after you start wearing them. And there is the beginning of your next corn, ingrown toenail, or bunion!

Are You Getting That Perfect Fit?

Is it possible to find a perfect fit? *Professional Shoe Fitting* gives the quick answer no. Why not? "Because of several insurmountable ob-

Points to Watch When Choosing Shoes

William A. Rossi and Ross Tennant offer the following suggestions in their book *Professional Shoe Fitting*.

"The purpose of measuring the foot is not, as supposed, to determine the precise shoe size required." Why is that? Because shoe sizes can be affected by many factors, such as heel height, style, patterns, materials used, and brand. This is especially true today when footwear is being manufactured in so many countries with varying standards.

When your foot is measured, pull the toe of the sock or stocking forward so that the toes are not bent, resulting in a false reading.

How should you be measured—seated or standing? "To measure with the customer seated is the lazy way." It results in a false reading. Therefore, stand up to have your feet measured. Yes, both feet. Do not assume that the left foot is the larger. Measure both!

"Professional shoe fitting is a skill and service that is the exclusive territory of an elite corps of individuals associated with an equally elite legion of stores who understand and appreciate the importance of highly skilled shoe fitting."

stacles. . . . No person has two feet of exactly the same size, shape, proportions or functional character." So if a shoe is perfect for your larger foot, it will not quite fit the bill for the other one. "This does not suggest that good fit isn't achievable, but only that we should be more cautious about the term or idea of 'perfect' fit."

If you want to see where your feet are causing pressure in a shoe, take a look at some of your old, used shoes. Look inside the shoe at the lining. Where do you notice the most wear? Frequently, the evidence will point to the heel seat, behind the heel, and to the ball of the foot. What does this mean? It means that "certain sections of the shoe are not properly matched with the corresponding sections of the foot. Some sections are getting excessive wear while others are virtually untouched."

Even the throat of the shoe is important for comfort. Have you noticed that shoes can have different throat-line styles? With the bal style, the two upper quarters are pulled together at the lowest lace point. However, if you have fleshy feet, then the blucher style is more comfortable, since the sides remain separated at the lowest lace point. (See diagram.) Why is this detail important? The same source says: "Many or most heel irritations from the shoe are often the direct result of a shoe being too tight at the throat, thus crowding the heel back against the counter."

What About Women's High-Heeled Shoes?

The female preference for high heels imposes different stresses on the body. High heels tend to alter body posture, often causing a for-



Blucher



Bal

Throat-line styles

ward tilt, which, in turn, demands more knee bend in order to keep the body straight. High heels also contract the calf muscles, which then become more prominent.

Thus, the heel is often the crucial part of a woman's shoe and the key to her comfort or discomfort. *Professional Shoe Fitting* says that there are three prime reasons for the heels on shoes: (1) "status," such as adding to one's height, (2) cosmetic purposes—an added design or style feature on the shoe, and (3) enhanced appearance—such as women's high heels giving more contour to the legs.'

Women should be particularly conscious of the heel pitch, which determines where the line of the body weight passes through the heel. If that line is at the rear or front edge of the heel, trouble could result. Why is that? Because it can lead to the heel buckling and causing a nasty fall.

From this brief discussion, it is evident that getting the right fit of shoes takes time and perhaps even extra expense, since a good shoe requires more time to produce. But your shoes

can mean so much to your general comfort and even to your health. So take your time. Get proper measurements.

Be patient. Do not be fooled by fashion or appearances.

All shoe designs are based on these seven basic styles



SUPER! It was really great!" "Thank you for the hospitality and the lovely exhibits. We really felt at ease." What moved scores of visitors to make appreciative expressions like these? The weekend open house held by the Germany branch office of Jehovah's Witnesses. On three days, from Friday, May 24, to Sunday, May 26, 2002, the doors of the facilities at Selters-Taunus were open for visitors to come and join the more than 1,000 branch volunteers in marking the centennial of the Germany branch office.

Congregations of Jehovah's Witnesses in the vicinity of the branch office eagerly participated in a special invitation campaign. Two weeks before the big event, more than 100,000 invitations were handed out to people or were left at their homes. This campaign was augmented



BY AWAKE! WRITER IN GERMANY

by advertisements and long articles in newspapers and by radio broadcasts. Personal invitations were issued to suppliers and officials. A total of well over 7,000 accepted—a substantial portion being non-Witnesses.

Visitors roamed through the printery, bookbindery, shipping department, workshops, and laundry, as well as parts of the administration building.

Exhibits informed people about the firm stand for Bible principles that was taken by Jehovah's Witnesses in Germany under the Nazi and the Communist regimes. And a Bible exhibit with more than 700 items focused on the use of the divine name, Jehovah. To repeat all the apprecia-

tive comments heard would be impossible, but here we present a selection of expressions.

"Everyone is so friendly here. Things are so clean, so tidy. Everything fits well together—the people who live here and the surroundings. We hope we can take along some of your friendliness with us."—An elderly couple.

"Thank you for the good food and for taking care of us in such a nice, friendly way. We thoroughly enjoyed it, and we would love to come again. The people here were really, really nice!"—Guest-book entry made by a group from a glass technology college.

"Thank you very much for the warm reception at your facilities. [We] found the visit very interesting. Our compliments to

An OPEN HOUSE That Touched Hearts

the people in charge of the laundry and dry cleaning departments, for we have never visited such neat and tidy facilities."—E-mail from a representative of a detergent and laundry equipment company.

Eva, who served as a tour guide, reported: "In each tour that I gave, there was always someone who said about the residential rooms: 'Just wait till we get our suitcases. We're moving in!'"

As a woman in an electric wheelchair was studying a sketch of the facilities, a volunteer asked her if she could be of assistance. "Not really!" the woman replied.

She said that she had already been on the premises for five hours and actually could not sit in an upright position anymore. Normally she was bedridden, and she was presently in real pain. However, she explained: "I can lie down at home, but open house is only once!" She added: "Everything is so interesting that I want to make sure I see it all!"

Little Georg, about five years old, was asked what he liked best. Thrilled with the rotary printing presses, he answered: "The rolls of paper! They put them in one



◆ **Shuttle service for those who were aged, disabled, or just tired**



◆ **A display of preaching methods used in the past**

end, and out they came at the other end as newspapers. That was super!"

One Witness had a nice surprise. Her husband, a non-Witness who had only attended one Christian meeting, agreed to come along to visit the open house on Saturday. On Sunday when his wife came home from the congregation meeting, he was all dressed up and ready to go out. "What's going on?" his wife asked. "Well, I didn't quite get to see everything yesterday," he replied. "So as soon as you are

◆ **Welcome to our open house**



ready, we'll leave for Selters. I want to get a better look."

At the Bible exhibit, an elderly, well-dressed lady timidly asked where she could use a phone because she had to place an urgent call. As it turned out, her husband is a bookbinder, specializing in the restoration of old books. She and her husband regularly meet with a circle of other book lovers, one of whom is a Protestant pastor, a passionate Bible collector. He was the one she desperately wanted to call. Since he was not at home, she left a message on his answering machine: "Be sure to come over here today if at all possible. You've never seen anything like it, I'm sure. You shouldn't miss it!"

A couple with their child came to visit from the nearby town of Limburg. They had never heard of Jehovah's Witnesses until they received an invitation at their home. The couple decided to come and have a look at these large facilities in Selters. Marlon and Leila, volunteers at the Germany branch, met them and explained more about Jehovah's Witnesses and life at the branch office. The family was so impressed that the parents asked for someone to call on them for a regular home Bible study.

"It was really nice here and a lot of fun. I only saw the printery, but it was so nice. You are just great, friendly people, and that's what I like."—Stefanie (12 years of age), a guest-book entry.

A woman from the neighboring village said: "I have to tell you something. I'm Muslim, but I have always wanted to see how it is here. You are all so pleasant and easygoing. You make us [foreigners] feel welcome in Germany. You reach out to people. That's

marvelous! Tomorrow I'm going to come again with my husband." In the guest book, she wrote: "It was wonderful! I feel like I'm in Paradise."

The driver of one of the shuttle buses operating between the parking area and the entrances overheard one passenger saying to another: "What friendliness! And to think I didn't have a clue about what was being produced here. I've just come to know what these people are doing here. Look at how they conduct themselves. It must have something to do with their religious upbringing and education."

Two hours after closing time, a man walked back and forth in the courtyard in front of the administration building. He was very thoughtful and kept shaking his head and looking back at the building. Then he approached a branch volunteer, saying: "You could see that everything was done out of love. I am not one of Jehovah's Witnesses, but I wish you Jehovah's blessing."

And a Witness wrote: "With this short letter, I would like to send you my heartfelt thanks. You spared no effort in making these open house days as pleasant as possible. . . . All in all, it was a foretaste of the time when all mankind will live together in unity! . . . These days of open house certainly contributed to the glory of our God, Jehovah."

—Sandra.



◆ **Bible exhibition**



◆ **A volunteer explains technology in simple terms**

The Lonely “Lady” of the Bosphorus

BY AWAKE! WRITER IN TURKEY

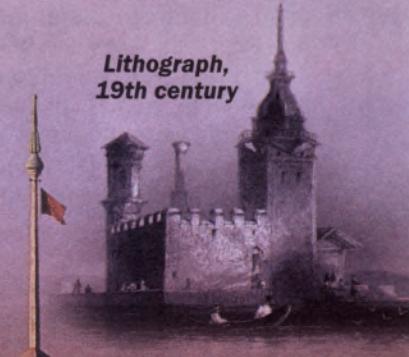
LIKE a mother standing in the doorway of her house waiting for the return of her loved ones, she has stood lonely and forlorn for hundreds of years at the point where the Bosphorus Strait runs into the Sea of Marmara. (See map.) The fast-running currents make the crashing of waves against the rocky shore resemble lace around the bottom of her skirts. From her vantage point here, this “lady”—the Maiden’s Tower—has silently witnessed the passage of history.

Over the centuries she has seen the sinking of ships, the rapacity of armies in blood-drenched conflicts, and the frivolities of palace amusements. Truly, when Istanbul is mentioned, the first thing that comes to the minds of many is this tower, so symbolic of the old city.

It is difficult to describe the attraction the tower has for so many people. Every evening as the sun sets, there is always someone on the Asian shore gazing across the water at the Maiden’s Tower with the silhouetted city of Istanbul as its backdrop. Perhaps there is an old man standing there remembering the events of his life or a young man—so full of hope—dreaming about what the future holds for him.



*Lithograph,
19th century*



Or maybe a woman who has lost her loved ones is thinking that the tower looks as lonely as she feels. Turkish poet Sunay Akin, who frequently muses about the tower in his writings, once said: "The worst view of Istanbul is from the Maiden's Tower because then the beauty of the Maiden's Tower is missing."

Tracing the history of the tower is not easy. In fact, the more one delves into the past of this "lady" of the Bosphorus, the more her past seems hidden in a shroud of tradition and legend.

Early History of the Island

The earliest known facts concern, not the tower, but rather the rocks upon which it is built. In 411 B.C.E., during the wars between Athens and Sparta, Byzantium (now Istanbul) sided with the Spartans. Thus, the European side of the Bosphorus went to Sparta, and the Asian side to Athens. Eventually, Sparta lost out to Athens, but for the time being, Athens took no further action against Byzantium, preferring instead merely to take control of the Bosphorus Strait and benefit from the taxes levied on vessels sailing through it. It is thought that the Athenian general and politician Alcibiades built a tax station on the rocks. However, no mention is made of a tower existing there at that time.

Some years later Byzantium itself came under the sovereignty of Athens. Fearing threats from King Philip II of Macedonia, Athens sent 40 war gal-

leys to reinforce its position in Byzantium. The commander of the fleet, Admiral Hares, had his wife accompany him, but she later took ill and died in Chrysopolis (Üsküdar). Admiral Hares constructed an altar to his wife, and the story is that it was erected on the rocky islet where the Maiden's Tower came to be built.

How Has the Tower Survived?

According to *The Book of the Maiden's Tower*, the first time something resembling a tower was built on the rocks was during the reign of Manuel I Comnenus (1143-80), when a small fortress-like structure armed with cannons was built.

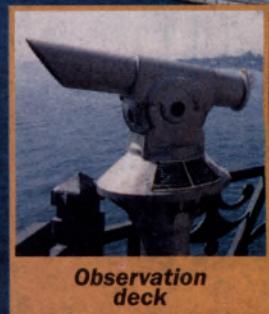
After Istanbul was conquered in 1453, the small fort was preserved, and it continued to be used for military purposes. Later a wooden lighthouse, which faced the Sea of Marmara, was added. Following the conquest of Istanbul, the tower stood watch while more of the pages of the history of mankind were being written in blood—vessels in the Bosphorus met in battle, and sword-wielding soldiers fought hand to hand. Cargo boats loaded with gunpowder and anything that would burn were turned against one another.

Over the years the tower suffered from the ravages of earthquakes and fires until finally in 1720, it was virtually destroyed by fire. Damat Ibrahim Pasha then rebuilt the tower in stone, adding a many-windowed turret overlaid with lead. In 1829

Restaurant



Observation deck



the tower was used as a quarantine hospital during an outbreak of cholera. Shortly afterward, the last major repairs were carried out during the rule of Mahmud II in 1832. In 1857 the Lighthouse Board took over the tower, and a French company was commissioned to turn the tower into a functional lighthouse, which was fully automated in 1920. The tower remained in use as a lighthouse for almost a hundred years.

During Ottoman times the tower was mostly used as a lighthouse to show the way at night; however, it was also used by day when the weather was foggy. In stormy weather small boats would seek safety by tying up to the tower to escape being swept away in the waves. Cannons were fired from the tower during official celebrations.

Every now and then, the Ottoman Palace used the tower differently. Government officials being sent into exile or facing execution were held in the tower as a way station before going off on their long journey or being sent to their death.

Its Role Keeps Changing

After 1923, official use of the tower was discontinued, and it functioned only as a lighthouse. During the difficult years of World War II, the tower was repaired and the internal structure strengthened with concrete. Following 1965, when the tower was handed over to the navy, it was used for a time as a military communications center. Then, during the latter half of the 20th century, international maritime traffic through the Bosphorus intensified, with more and bigger ships navigating the Strait. With the coming of the big ships, the era of quiet solitude for the Maiden's Tower ended. After 1983 the tower was used by the Turkish Maritime Authority as an intermediate control point for directing the flow of traffic through the Strait.

Hardly had 1989 started when an extraordinary news item once more riveted attention on the "lady" of the Bosphorus. "Maiden's Tower Poisoned," read the headline on a report, which claimed that cyanide, used for fumigating vermin-infested vessels in shipyards, was being stored in the tower. Previously kept in a recently demolished facility at the docks, the deadly poison was being stored in the tower "because there was nowhere else to put it." Thus the lonely "lady" of the Bosphorus came to be poisoned. More seriously, noted the report, had there been an explosion of that cy-

anide gas, it would have been disastrous for Istanbul. After eight months of high exposure in the press and on television, the situation was finally resolved when the containers of cyanide were moved to another location.

It was hardly surprising when in May 1992 a group of young poets went out to the Maiden's Tower and announced, with the support of the mayor, that they wanted the virtually abandoned tower to be made into a cultural center. After all, for hundreds of years it had been an inspiration to countless poets and writers. For a short while thereafter, the tower was alive with exhibitions of art and photography, and a number of concerts were held there. For this short period, the tower was declared a "republic of verse."

The Maiden's Tower Today

With a view to opening the tower to visitors, extensive repairs were made in 1999. Following this, announcement was made that one year later, as part of a tourism project, it would be opened as a restaurant and cultural center. Today a restaurant, a café and bar, an observation deck, and a souvenir shop are open to visitors and tourists. Small boats provide transportation from various boarding points around Istanbul.

Admittedly, these commercial restorations have not been well received by many people. Still, the Maiden's Tower has lost little, if any, of its charm. If your travels ever take you to Istanbul, be sure to visit the Maiden's Tower. You might enjoy sitting in one of the many tea gardens on the Asian side of Istanbul, where, as you sip your tea, you can appreciate the matchless vistas of the Bosphorus and the Maiden's Tower. Then, just for a moment or two, perhaps you can recall the long history of this gracious "lady" of the Bosphorus.

In Our Next Issue

■ Are You Getting Enough Sleep?

■ Music Videos

—How Can I Be Selective?

■ When a Chemical Plant Exploded

Watching the World

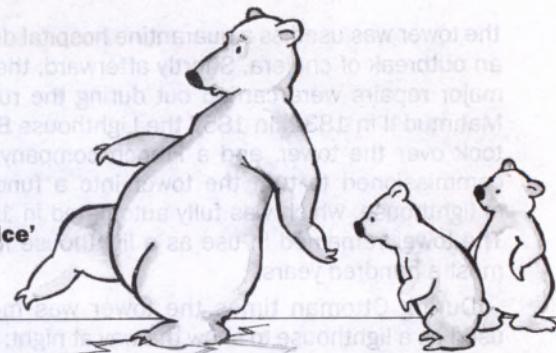
Blood Transfusions Can Harm Lungs

"People who receive blood products, particularly plasma-containing products, may be at risk for developing transfusion-related acute lung injury (TRALI)," states *FDA Consumer*, a journal of the U.S. Food and Drug Administration. This condition may lead to death if not recognized and treated correctly. "TRALI can occur when white blood cell antibodies in the donor's blood react with the recipient's white blood cells, causing a change in the lung tissue that allows fluid to enter. Most donors implicated in TRALI reactions are women with more than two children or donors who have had multiple transfusions." Symptoms "include fever, shortness of breath, and a drop in blood pressure. X-rays often show the [transfusion] recipient's lungs as completely white."

Poisoned Bees

"Will we be able to eat any French honey ten years from now?" asks the French news-magazine *Marianne*. Millions of bees are being killed by poison every spring, causing the national production of honey to drop from 45,000 tons in 1989 to 16,000 tons in 2000. In a single week, one beekeeper lost his 450 hives—22 million bees! Many honey producers blame agricultural chemicals such as pesticides, especially the cheaper and more potent products that are imported illegally. Some farmers have even added used engine oil or bleach to their chemicals for greater effect! If nothing is done, "there is a risk

Polar Bears on 'Thin Ice'



"The polar bear's existence is seriously endangered by climatic warming," says Germany's *Nassauische Neue Presse*, reporting on a World Wildlife Fund (WWF) study. According to the WWF, the amount of Arctic sea ice, or pack ice—the main habitat and hunting ground of polar bears—is shrinking as a result of warmer weather. Experts say that the average air temperature over the Arctic has "increased by 5 degrees [Celsius] [9 degrees Fahrenheit] over the past 100 years." What is more, "pack ice has decreased by 6 percent over the past 20 years," and "a 60-percent reduction in summer sea ice could be expected by the year 2050." Less sea ice and longer ice-free periods restrict the polar bear's opportunities to hunt and thus accumulate needed fat reserves. Hardest hit are pregnant females and cubs. In some areas "not even half of the cubs survive the ever-extending ice-free period," reports the newspaper. Other problems the bears face are "hunting, toxic chemicals, and oil pollution."

that French honey will become merely an object of folklore," says *Marianne*.

Children Unsure About Death

"Once a person dies, do you think that person can be restored to life?" Professor Hiroshi Nakamura of Japan Women's University put that question to 372 students in the upper grades of elementary school. One third answered yes, and another third were unsure, reports the newspaper *Sankei Shimbun* of Tokyo. "This perception may have been derived from computer games in which, even if the hero dies, all one has to do is press the reset button to start it all over again from scratch," says the pa-

per. According to the professor, the survey "shows that many students even in upper grades of elementary school do not have a correct understanding of what death really means." He suggests that parents teach children about death by exposing them to the death of pets and letting them visit dying relatives.

Europe Declared Polio-Free

For the 870 million people of the European Region, the June 2002 certification of the region as polio-free is "the most important public health milestone of the new millennium," says the World Health Organization. The European Region, which comprises 51 member

states, "has been free of indigenous poliomyelitis for over three years." This result is the culmination of a 14-year project to eradicate polio through coordinated national immunization campaigns. The disease has already been eradicated in the Americas and the Western Pacific. Caused by a virus that attacks the nervous system, polio is highly infectious and can cause total paralysis and even death. At present it can be prevented but not cured.

Critical Water Shortage

"More than half of the world's population will be affected by water shortages by 2032, causing severe health consequences, unless urgent action is tak-

en," says *BMJ* (formerly *British Medical Journal*). A United Nations report has found that although the number of people enjoying better water "increased from 4.1 billion in 1990 to 4.9 billion in 2000, 1.1 billion people in the developing world still have no access to safe drinking water. A total of 2.4 billion people currently lack adequate sanitation facilities." This has resulted in "four billion cases of diarrhoea and 2.2 million deaths every year," not to mention the suffering caused by intestinal worms, schistosomiasis, and trachoma.

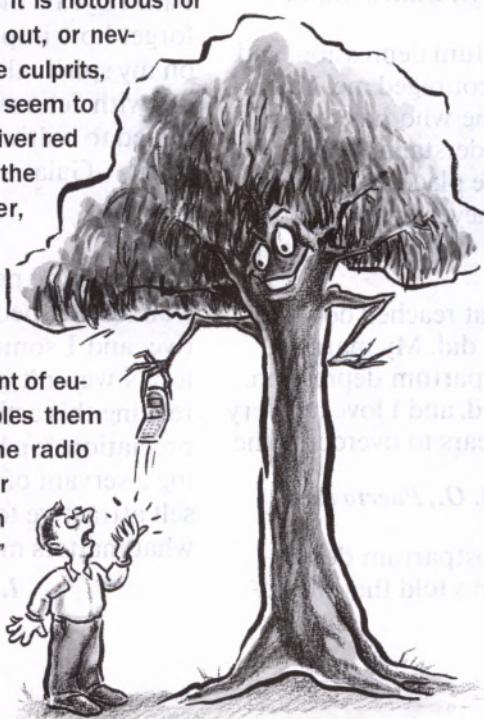
Substitute Skin

The skin is the body's largest organ and is its first line of

defense against disease-carrying organisms, dehydration, and hypothermia. Therefore, burn victims and diabetics with open ulcers face a high level of risk. Human cadaver skin is commonly used as a substitute covering, but it is in short supply. Other drawbacks are that skin transplants can transmit disease and are subject to rejection. *The News of Mexico City* reports that biomaterial from the small intestines of pigs is being successfully used as grafts on patients with hard-to-cure wounds. Interestingly, the portion of pig intestine that is used, called small-intestine submucosa, is very similar to human skin and is plentiful. Reconstructive surgeon Jorge Olivares, who is conducting experiments with this substitute skin, states: "The patients I have treated have almost no scarring, and the wounds tend to heal in a few weeks. The best part is that the patients enjoy almost instant relief from their pain and inflammation."

Eucalypts Interfere With Mobile Phones

"In many parts of [the state of New South Wales], the performance of mobile phone towers is frequently far worse than the equivalents in Europe and the United States," says Australia's *Sydney Morning Herald* newspaper. The problem is most noticeable along the Murray River in the south of the state. Even though the region is relatively flat, "it is notorious for conversations dropping out, or never even beginning." The culprits, according to the report, seem to be "the thick stands of river red gums [eucalypts] lining the Murray." Roger Bamber, a telecommunications company director, "believes there is something about the shape, size and moisture content of eucalypt leaves that enables them to absorb mobile phone radio frequency emissions far more efficiently than those of other trees," says the *Herald*.



Adrift for Four Months

Tauaea Raioaoa, a 56-year-old fisherman, survived being adrift for four months in the South Pacific Ocean, says a report in the Tahiti newspaper *Les Nouvelles de Tahiti*. He left Tahiti on March 15, 2002, "on board his small green 25-foot boat, christened the 'Tehapiti,' however, he sustained motor damage off the coast of Tahiti." After drifting some 750 miles, he was picked up near Aitutaki, one of the Cook Islands, on July 10, more than 45 pounds lighter than when he left. A seasoned and resourceful fisherman, Raioaoa survived by "feeding himself on raw or dried fish and collecting rainwater in a bucket and an icebox."

From Our Readers

Postpartum Depression Thank you from the bottom of my heart for the article "I Won My Battle With Postpartum Depression." (July 22, 2002) I gave birth a year and three months ago. Suddenly, I became a different person. Sometimes I hurt loved ones, as I was not able to explain what was happening to me. Now the situation is beginning to improve. The article helped me.



A. P., Romania

After reading the article, my Bible student confided that she has that illness. Now she goes to the hospital each week and, with medication, is able to carry out her responsibilities cheerfully.

A. M., Japan

This article is an answer to my prayers. You dear brothers have your finger on the pulse of the needs of your sisters. Receiving this article was like receiving a giant hug from Jehovah and his organization.

C. W., United States

I am recovering from postpartum depression, and this article strengthened and encouraged me. You included details that only someone who has experienced this problem can fully understand. I plan to keep this issue of *Awake!* in a safe place and to consult its helpful suggestions whenever I need a lift.

E.V.F., Brazil

I have never read an article that reached down to the core of my heart as this one did. My marriage broke up as a result of my postpartum depression. My daughter is now five years old, and I love her very much. It took me about three years to overcome the situation.

A. O., Puerto Rico

I had been struggling with postpartum depression for three months. When I was told that the lat-

est *Awake!* had an article on the subject, I cried so hard that I couldn't speak. It was the best article on postpartum depression I have ever read. I am grateful to Jehovah and his organization for taking such good care of us!

A. L., Canada

Young People Ask My heartfelt thanks for the article "Young People Ask . . . How Can I Make Myself More Attractive?" (July 22, 2002) I am 22 years old, and that article encouraged me to polish up my inner qualities. My first goal is to put on the quality of mildness. More than anything, I want to become beautiful in Jehovah's eyes. Please continue to provide such fine articles.

A. H., Japan

This article touched my heart. I am 18 years old, and sometimes I forget how important it is to work on my spiritual qualities. From now on, with Jehovah's help, I am determined to cultivate the fruitage of the spirit.—Galatians 5:22, 23.

M.R.A., Brazil

During the past two years, I often wondered if people found me attractive, and I sometimes felt that my looks weren't good enough. After reading this article, I felt so much appreciation for knowing that by being a servant of God, I can make myself attractive to him and that this is what matters most.

I. P., United States

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A MAN WHO CHOSE TO OBEY GOD

IN THE dark days of 1937, when differing ideologies caused tension in many European countries, true Christians faced difficult choices. Should they obey God or men? (Acts 5:29) Young men of military age knew that obedience to God could cost them their lives.

Antonio Gargallo was a 19-year-old Spaniard who faced such a choice. The civil war in Spain had already dragged on for about a year when he was called up for military service by General Franco's nationalist forces. The previous year, Antonio had been baptized as one of Jehovah's Witnesses, and he had read the Scriptural counsel that God's servants should remain neutral and not even learn war. (Isaiah 2:4; John 17:16) Unwilling to become a soldier and kill his fellow countrymen, Antonio attempted to flee to France. But he was apprehended and taken to an army barracks in Jaca, Huesca, near the French border.

A military tribunal offered him a stark choice: Take up arms or be executed. Antonio decided to obey God. Shortly before his execution, he wrote the following letter to his mother and sister, who were not Jehovah's Witnesses:

"I have been arrested, and without even being heard, I have been sentenced to death. Tonight I will cease to live on earth. Do not get upset or weep . . . , for I have obeyed God. Any-way, I lose very little because, God willing, I will have a new and better life. . . . I feel very calm as my last hour arrives. Please receive a last hug from this your son and brother who truly loves you."*

Three soldiers reported that on the way to his execution, Antonio sang songs of praise to Jehovah. Such sacrifices do not go unnoticed by God or by his Son. We can be sure that faithful Christians, such as Antonio, will reap their reward by means of a resurrection.—John 5:28, 29.

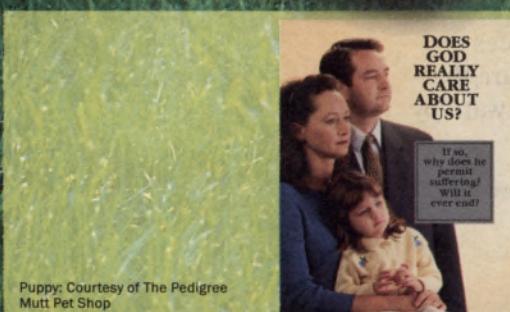
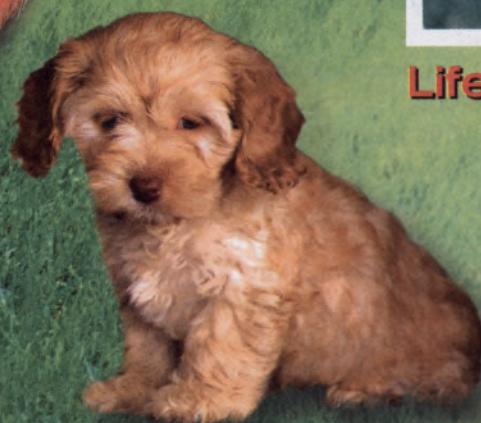
* Antonio's letter, preserved for decades in Spanish military archives, never reached his mother.



Antonio Gargallo



Life Is Precious



Puppy: Courtesy of The Pedigree
Mutt Pet Shop

www.watchtower.org

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