

Awake!

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What Can We Learn From the Past?



Awake!

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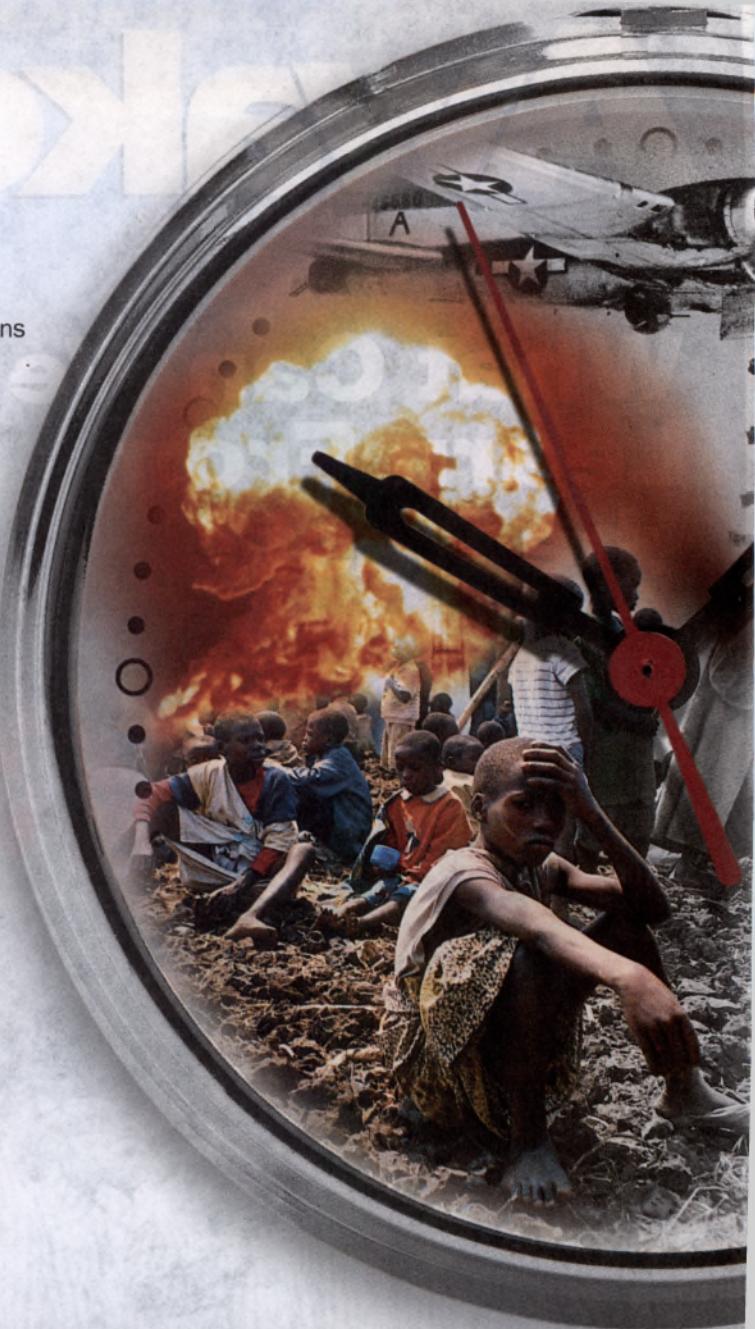
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What we can learn from the past has great meaning for the future. How? What does the future hold?

Great Learning yet Little Change

"In spite of the recent triumphs of science, men haven't changed much in the last two thousand years; and in consequence we must still try to learn from history."

—Kenneth Clark, *Civilisation—A Personal View*.

THREE have certainly been some remarkable advances in science over the centuries. *Time* magazine says that these have "given millions of us the highest standard of living in history." Some of the greatest advances have been in the field of medicine. In medieval times "medicine was crude and brutal," says historian Zoé Oldenbourg. "A doctor could kill as easily as cure."

Not Always Willing to Learn

People have not always been willing to learn. In the late 19th century, for example, many doctors ignored compelling evidence that they themselves were somehow transmitting disease among their patients. So they stuck to dangerous practices and refused to wash their hands before moving from one patient to another.

Still, science and technology continued to advance. Logically then, from past experiences humans should have learned how to make the world a happier, safer place. But that is not how things have worked out.

Consider Europe in the 17th century. That period was described as an age of enlightenment and reason. Yet, the fact remains that "with all its outpourings of genius in art and science," says Kenneth Clark, "there were still senseless persecutions and brutal wars waged with unparalleled cruelty."

In our time there is still a reluctance to learn from the past in order to avoid its mistakes. As a consequence, our very existence on this planet appears to be under threat. Writer Joseph Needham concluded that the situation has become so dangerous that 'all we can now do is hope and pray that maniacs will not release upon mankind powers that could extinguish all life on earth.'

Why is it that despite all man's genius and learning, we are still mired in a world filled with violence and brutality? Will this ever change? The next two articles will consider these questions.

COVER: WWI cannons: U.S. National Archives photo; WWII Holocaust victims: Robert A. Schmuhl, courtesy of USHMM Photo Archives

Pages 2 and 3:
B-17 bomber: USAF photo;
woman: Instituto Municipal de Historia, Barcelona; refugees:
UN PHOTO 186797/
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explosion: U.S. Department of Energy photograph

The Nations Are Still Not Learning

"If men could learn from history—what lessons it might teach us! But Passion and Party blind our eyes, and the light which Experience gives is a lantern on the stern which shines only on the waves behind us!"—Samuel Taylor Coleridge.

DO YOU agree with English poet Samuel Coleridge? Is it possible that we can be so blinded by passion for a cause that we repeat the tragic mistakes of past generations?

The Crusades

Consider, for example, some of the things people did during the Crusades. In 1095 C.E., Pope Urban II urged "Christians" to take the Holy Land from the Muslims. Kings, barons, knights, and commoners in all the nations under the control of Urban II responded to his call. According to one medieval historian, there was "hardly a people living according to the law of Christ" that did not rush to support the cause.

Historian Zoé Oldenbourg states that the majority of crusaders had an "absolute conviction that in taking the cross [they were] enlisting directly in the service of God Himself." They saw themselves, she says, in the role of "destroying angels falling on the children of the devil." They also believed that "all who died would win the crown of martyrs in heaven," says writer Brian Moynahan.

Perhaps the crusaders were unaware that their enemy believed something similar. Islamic soldiers, says historian J. M. Roberts in his book the *Shorter History of the World*, also went into battle with the conviction that they were fighting for God and "that death on the battlefield against the infidel would be followed by entry to paradise" in heaven.

Both sides were taught that theirs was a just war—approved of and blessed by God. Religious and political leaders nurtured these beliefs and fanned the flames of their subjects' emotions. And both sides committed unspeakable atrocities.

What Kind of People?

What kind of people did these terrible things? The majority were ordinary people—little different from people today. No doubt many of them were fired by idealism and a desire to right the wrongs that they perceived in the world of their day. In their emotionally charged state, they seemed oblivious to the fact that in their fight for "justice,"

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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they brought nothing but injustice, pain, and suffering to hundreds of thousands of innocent men, women, and children who were trapped in the battle zones.

Has that not been the pattern throughout history? Have not charismatic leaders repeatedly moved countless millions of people—who would never normally have contemplated such conduct—into savage and barbarous wars against their religious and political opponents? The call to arms on both sides of the conflict and the claims that God was with each side legitimized the violent suppression of political and religious opposition. It was part of a well-established pattern that has served the interests of tyrants for many centuries. This, says Moynahan, is the standard that “would serve the architects of the Holocaust and modern ethnic cleansers as surely as it launched the first crusade.”

‘But sensible people today would no longer allow themselves to be manipulated in that way,’ you may say. ‘Are we not now much more civilized?’ That ought to be the case. But have the lessons of history really been learned? Who can honestly say that this is true when contemplating the history of the past hundred years?

The First World War

The pattern set by the Crusades was repeated, for example, at the time of the first world war. It is “one of the paradoxes of 1914,” says Roberts, “that in every country huge numbers of people, of all parties, creeds and blood,

seem, surprisingly, to have gone willingly and happily to war.”

Why did huge numbers of ordinary people go “willingly and happily to war”? Because they, like those who so willingly went to war before them, had their values and beliefs molded by the philosophies of the day. While some may have been inspired by principles of freedom and justice, there is little doubt that many were moved by an arrogant belief that their nation was superior to others and thus deserved to be dominant.

These were conditioned to believe that war was an inevitable part of the natural scheme of things—some kind of “biological necessity.” “Social Darwinism,” says writer Phil Williams, fostered the idea, for example, that war was a legitimate means of “eradicating those species not worthy to survive.”

Each one, of course, thought that his cause was just. With what result? During World War I, “governments,” says writer and historian Martin Gilbert, “beat the drums of racism, patriotism and military prowess”—and people blindly followed. Economist John Kenneth Galbraith grew up in rural Canada during that war. He said that all around him, people spoke about “the manifest stupidity of the conflict in Europe.” “Intelligent men . . . did not lend themselves to such insanity,” they said. But once again, they did. With what consequences? Some 60,000 Canadian soldiers were among the more than nine million military men who died on both sides in

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Barbarism and suffering have marked human conflicts



the obscenity that came to be called the first world war.

No Lesson Learned

Within the next two decades, the same spirit began to manifest itself again with the rise of Fascism and Nazism. Fascists began to use “the traditional propaganda tools of symbols and myths to arouse peoples’ emotions,” writes Hugh Purcell. A particularly powerful tool they used was the potent mixture of religion and politics, praying for God’s blessing on their troops.

One who was “a master of crowd psychology as well as a brilliant orator” was Adolf Hitler. Like many demagogues of the past, says Dick Geary in *Hitler and Nazism*, Hitler believed that ‘the masses were swayed not by their brains but by their emotions.’ He played on this human weakness by cleverly exploiting the age-old technique of directing people’s hatred against a common enemy—as when he “turned the fears and resentments of Germans against the Jews,” says Purcell. Hitler vilified the Jews, saying, ‘The Jew is the corrupter of the German nation.’

What is horrifying about this whole era is that millions of seemingly decent people were easily incited to mass murder. “How could the people of a supposedly civilised country not simply tolerate but become implicated in the horrific barbarism of the Nazi state?” asks Geary. And it was not just a “civilised” coun-

try but also supposedly a Christian country! They were drawn into this because they preferred the philosophies and schemes of men to the teachings of Jesus Christ. And how many sincere, idealistic men and women have been led into horrific atrocities since then!

“What experience and history teach is this,” says German philosopher Georg Hegel, “that nations and governments have never learned anything from history or acted upon any lessons they might have drawn from it.” Many may disagree with Hegel’s philosophy on life, but few will disagree with that statement. Sadly, people do seem to have severe difficulty learning anything from history. But must that be true of you?

Surely, one clear lesson to be learned is this: We need something far more dependable than fallible human philosophies if the tragedies of past generations are to be avoided. But if not human philosophy, what should guide our thinking? Over a thousand years before the time of the Crusades, disciples of Jesus Christ demonstrated what the true Christian course—and the only reasonable course—should be. Let’s examine what they did to avoid being sucked into the bloody conflicts of their day. But is it likely that nations today will learn how to do that and thus avoid conflicts? And regardless of what nations do, what will God’s solution be to bring an end to all this human misery?

Rwandan refugees: UN PHOTO 186788/J. Isaac; collapse of World Trade Center: AP Photo/Amy Sancetta



**Top: Refugees in
war-torn area**



**How could supposedly
civilized people
become involved
in such acts of
unspeakable violence?**

Learning From First-Century Christians

"Look out: perhaps there may be someone who will carry you off as his prey through the philosophy and empty deception according to the tradition of men, according to the elementary things of the world and not according to Christ."—Colossians 2:8.

THAT was how the apostle Paul warned first-century Christians about the dangers of blindly following human philosophy. They could either stick to the dependable guidance given by Jesus and his apostles, teachings that had already brought them immense benefits, or become prey to the ever-shifting theories of men, a course that had already brought pain and misery to millions.—1 Corinthians 1:19-21; 3:18-20.

Living "According to Christ"

The crusaders of about a thousand years ago missed the point that living "according to Christ" means much more than simply professing allegiance to Jesus Christ. (Matthew 7:

21-23) It means living in complete harmony with the teachings of Jesus as found in God's inspired Word, the Bible. (Matthew 7:15-20; John 17:17) "If you remain in my word," said Jesus Christ, "you are really my disciples." (John 8:31) "All will know that you are my disciples," he said, "if you have love among yourselves."—John 13:35.

In truth, those crusaders had fallen prey to "empty deception according to the tradition of men." And it is little wonder that ordinary people were deceived, when their religious leaders, their very bishops, "became renowned

Jesus said that his Kingdom is no part of this world



as military men." A "warlike spirit became so common among the clergy," says the *Cyclopedia of Biblical, Theological, and Ecclesiastical Literature*, by McClintock and Strong, "that whenever anything was to be gained [by it], they were ever ready for war."

What led to this sad situation? Following the death of the first-century Christian apostles, apostate church leaders increasingly deviated from Christ's teachings, just as God's Word had foretold. (Acts 20:29, 30) A corrupted church eventually became more and more entangled with the secular state. In the fourth century, Roman Emperor Constantine supposedly converted to Christianity on his deathbed. Then, says the *Cyclopedia*, "the exchange of the idol standards for the banner of the Cross laid every Christian under obligations to serve as a soldier."

Of course, Christians really had no such obligation. But the "persuasive arguments" of human philosophy led them into gross violations of all that Christ stood for. (Colossians 2:4) Some very deceptive arguments have long

been used to justify human wars and conflicts. Really though, for a humane or godly person to get involved in "the diabolism of war, as systematically practiced in ancient or modern times," says the *Cyclopedia*, "cannot for a moment be reconciled with . . . the principles of Christianity."

The religions outside Christendom have also resorted to war down through the centuries. Just like the churches of Christendom, they have slaughtered members of their own religion as well as others because of national, political, and religious differences. They have used violence or the threat of it to convert others to their own beliefs. To try and gain their ends, some of them have participated in the bloodbaths of history. They are no different from the religions of Christendom.

Separate From the World

Why were first-century Christians able to keep clear of the bloody wars and politics of their time? Two basic principles helped them. First, there was the command of Jesus to the apostle Peter when Peter used a sword to



defend him: "Return your sword to its place, for all those who take the sword will perish by the sword." (Matthew 26:52) Second, the words of Jesus to Pilate when he asked about the nature of Jesus' kingship: "My kingdom is no part of this world. If my kingdom were part of this world, my attendants would have fought that I should not be delivered up to the Jews. But, as it is, my kingdom is not from this source."—John 18:36.

How did first-century Christians apply those principles? They kept themselves completely separate from the world, maintaining strict neutrality when it came to political and military affairs. (John 15:17-19; 17:14-16; James 4:4) They refused to take up arms against their fellowman. It is clear from history that first-century Christians joined neither the Jewish nationalist movements nor the imperial armies of Rome. At the same time, they did not try to tell the political leaders what to do, as that was the responsibility of those governmental leaders.—Galatians 6:5.

Justin Martyr, in the second century C.E., wrote about Christians' having 'beaten their swords into plowshares.' (Micah 4:3) In response to those who raised objections about the Christian position, Tertullian asked: "Shall it be held lawful to make an occupation of the sword, when the Lord proclaims that he who uses the sword shall perish by the sword?"

"Obey God as Ruler Rather Than Men"

Refusing to go to war did not make things easy for the early Christians. It went against the accepted beliefs of the day. Celsus, an enemy of Christianity, mocked their position. His belief was that everyone should go to war when those in power demanded it. Despite immense hostility, early Christians refused to follow any human philosophy that contradicted the teachings of Christ. "We must obey God as ruler rather than men," they said.—Acts 4:19; 5:29.

Jehovah's Witnesses in modern times have followed their example. In Nazi Germany, for instance, they resolutely refused to be drawn into Hitler's murderous wars. They were will-

**God's Word promises
everlasting life in perfection
on a paradise earth**

ing to endure savage persecution, even die if necessary, rather than violate their Christian neutrality. It is reported that “one-half of their number was imprisoned and one-quarter executed” by the Nazis for their adherence to Bible principles. (*Of Gods and Men*) Thus, of the tens of millions killed in World War II, not one was killed by a Witness of Jehovah. Rather than kill others, Witnesses were willing to sacrifice their own lives, as many of them did.

A Lesson We Can Learn

What lessons can history teach us? Surely one is this: Human philosophy has constantly led to hatred and bloodshed among nations and peoples. Ecclesiastes 8:9 rightly states: “Man has dominated man to his injury.” And the underlying reason for this is found at Jeremiah 10:23, where God’s Word says: “To earthling man his way does not belong. It does not belong to man who is walking even to direct his step.” No, God did not create humans to run their affairs successfully, independent of him. They were not given this capacity. All history has proved that.

Now, as individuals, we cannot change what the leaders of the nations do as they repeat the tragedies of the past, nor are we authorized to try to persuade them to take a certain course. But we do not have to be swept up into their conflicts and become part of them. Jesus said of his followers: “They are no part of the world, just as I am no part of the world.” (John 17:14) To avoid becoming part of this world’s conflicts, we must let God’s Word, the Bible—not the shifting sands of human philosophy—guide our lives.—Matthew 7:24-27; 2 Timothy 3:16, 17.

A Marvelous Future

God’s dependable Word does much more than shed light on the past and the present. It

provides sure guidance for the future. (Psalm 119:105; Isaiah 46:9-11) It also gives a clear picture of what God’s purpose is for this planet. He will not allow humans to destroy the earth by insanely misusing the immense powers that science and technology have given them. He will make sure that this earth reaches the Paradise condition he originally purposed for it.—Luke 23:43.

In this regard, God’s Word states: “The upright are the ones that will reside in the earth, and the blameless are the ones that will be left over in it. As regards the wicked, they will be cut off from the very earth; and as for the treacherous, they will be torn away from it.” (Proverbs 2:21, 22) This will take place soon,

as these troubled times give evidence that we are living in “the last days” of this present wicked system of things. (2 Timothy 3:1-5, 13)

And for a certainty, these last days are numbered; they are running out. Bible prophecy teaches us: “The world is passing away and so is its desire, but he that does the will of God remains forever.”—1 John 2:17; Daniel 2:44.

Soon God will “bring to ruin those ruining the earth” and will replace this present violent world with a new world in which “righteousness is to dwell.” (Revelation 11:18; 2 Peter 3:10-13) Then, for those who remain, “he will wipe out every tear from their eyes, and death will be no more, neither will mourning nor outcry nor pain be anymore.” (Revelation 21:1-4) Wars and violence will be gone forever, as the prophecy at Isaiah 2:4 will be realized to the full: “They will have to beat their swords into plowshares and their spears into pruning shears. Nation will not lift up sword against nation, neither will they learn war anymore.” You too can enjoy that marvelous, everlasting future if you learn from the lessons of history.—John 17:3.

Jehovah's
Witnesses
have learned
from
first-century
Christians

Crossword Puzzle

Clues Across

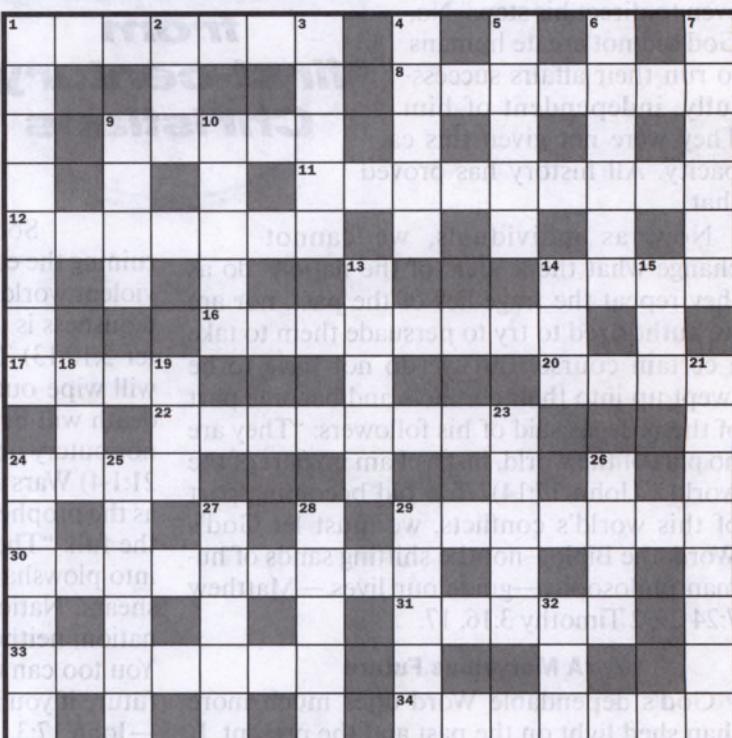
- When Jezebel ordered that Jehovah's prophets be killed, this palace steward hid 100 of them in caves (1 Kings 18:3, 4)
- Part of the title of Jesus that was recognized by even the unclean demon whom Jesus cast out of a man in the synagogue in Capernaum [2 words] (Luke 4:34)
- Coarsely ground hulled corn (Leviticus 2:14)
- Naomi's husband (Ruth 1:3)
- One of the territories that constituted the Roman tetrarchy of Philip (Luke 3:1)
- The tabernacle and temple both faced this direction (Numbers 3:38)
- Of Jesse's eight sons, David was this (1 Samuel 17:14)
- The Pharisees asked questions of Jesus in order to do this to him (Matthew 22:15)
- A descendant of Jacob's son Reuben (1 Chronicles 5:8)
- The Philistine city where Samson went to get the 30 outfits of clothing to give to those who "solved" his riddle (Judges 14:19)
- A site noted for its great cistern, where Saul inquired as to the whereabouts of David and Samuel (1 Samuel 19:22)
- The Roman tetrarchy over which Lysanias ruled (Luke 3:1)
- In John's vision of Jehovah's throne, the second living creature resembled this [2 words] (Revelation 4:7)
- Some of the locations upon which King Ahasuerus laid forced labor were these (Esther 10:1)
- Part of the tribute that King Mesha of Moab paid to the king of Israel included 100,000 male sheep in this condition (2 Kings 3:4)
- When told that this city would be overthrown, the king and his people repented, and the city was spared (Jonah 3: 1-10)

Clues Down

- If we are this way "to those who are taking the lead," they will be able to render their account "with joy and not with sighing" (Hebrews 13:17)
- This territory, overseen by one of Solomon's sons-in-law, provided food one month out of the year for the king's household (1 Kings 4:11)
- Speaking of God's rejection of natural Israel in favor of the spiritual nation, this prophet foretold that "those not my people I will call 'my people'" (Romans 9:25)
- In John's vision, the angel is said to use this to bind Satan (Revelation 20:1)

- Term referring to the position of authority held by each of the 24 persons seen seated on thrones surrounding Jehovah's throne (Revelation 4:4)*
 - A site in Judah where descendants of Judah's son Shelah resided (1 Chronicles 4:22)
 - In prayer, the afflicted one describes his bones as being in this state [2 words] (Psalm 102:3)
 - Feeling as if Jehovah had focused on his sin, Job said that Jehovah had applied this over his error (Job 14:17)
 - Aquila and Priscilla left this land and went to Corinth because of Claudius' decree banishing the Jews (Acts 18:2)
 - On God's part, this is always justified and under control (Joshua 7:1)
 - Seventh letter of the Greek alphabet
 - Isaiah likened wicked people who are alienated from God to this when it is wild (Isaiah 57:20)
 - Jesus mentioned this plant when speaking of the scrupulous tithing of the Pharisees (Luke 11:42)
- * The scripture cited has a form of the word needed.

- The city in Edom where King Hadar had his royal residence (Genesis 36:39)
- The last of the Judean kings to reign in Jerusalem (2 Kings 24:18)
- A city that became the inheritance of the tribe of Asher (Joshua 19:27)
- This writing instrument was used to make impressions on clay or wax (Isaiah 8:1)
- A chosen manner of conducting oneself (Romans 12:13)
- Jesus mentioned this habitat of foxes in making the point that those who follow him will experience hardship (Luke 9:58)
- This wicked king of Moab had such a fat belly that the sword that Ehud thrust into it went completely inside (Judges 3: 17-22)
- Jesus agreed with the scribe who said that love of God and neighbor was worth more than all these offerings (Mark 12:33)
- Expressing incredulity because Jesus did not seem to know what had recently taken place in Jerusalem, Cleopas asked Jesus if he was one of these (Luke 24:18)
- Adam's wife (Genesis 3:20)



TAPPING THE EARTH'S ENERGY

BY AWAKE! WRITER IN THE PHILIPPINES

Beneath the surface of the earth lies a huge treasure. It is not gold, silver, or precious stones. Rather, it is a tremendous store of heat called **geothermal energy**.

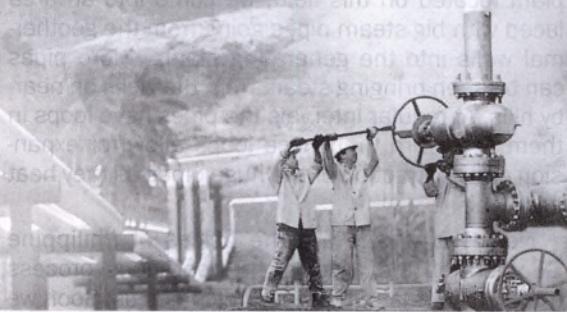
MUCH of this heat is stored in underground layers of molten rock, or magma. The earth's heat is indeed a treasure because it is a clean source of energy that offers distinct advantages over oil, coal, natural gas, and nuclear power.

The temperatures deep inside the earth are in the order of hundreds and even thousands of degrees Fahrenheit. The amount of heat conducted to the earth's surface from this interior in one year is thought to equal some 100 billion megawatt hours of energy—many times the electrical power used worldwide. An astounding amount of energy indeed! Harnessing this treasure, though, is a challenge.

Accessing the Treasure

A certain amount of earth's heat is present in the ground, even near the surface. This can be tapped using heat pumps connected to loops of piping buried in the ground. The energy thus gathered can be used to heat homes in the wintertime or perform other useful work. Moreover, people living near hot springs or other geologically active areas have been able to use the available heat from the earth in additional ways. The ancient Romans, for example, used hot springs for baths.

The greater concentration of heat lies under the earth's crust, in a layer called the mantle. The average thickness of the crust is about 20 miles—much deeper than the drilling capacity of present technology. This crust, however, is made up of a number of plates and is thinner at certain places, especially where the plates meet. At these locations the magma is able to rise closer to the earth's surface and heat the water trapped in rock layers. This



water is usually only one or two miles below the surface of the ground, well within the reach of modern drilling techniques. It can be mined and put to good use. Let us see how.

Putting the Heat to Work

At sea level, water boils at 212 degrees Fahrenheit. But underground, pressures are much higher, and water remains liquid at higher temperatures.* Where the drilling taps into water that is above 350 degrees, the water can be used to drive electrical generators.

Water at high temperatures is usually found in areas of recent volcanic activity, such as the Pacific Ring of Fire, a region of both active and dormant volcanoes in the Pacific area. The country of the Philippines is located in this ring. And in recent years significant progress has been made here in tapping geothermal resources for the production of electricity. In fact, the Philippines has become one of the world's largest producers of power from geothermal energy. Over 20 percent of all electricity used in the country comes from this source.

To learn more about how electricity is produced from the earth's heat, Awake! visited a large geothermal facility called Mak-Ban, in the Philippine province of Laguna. This installation has the capacity to generate 426 megawatts of power. Let's take a brief look at how this is done.

A Visit to a Geothermal Plant

After we leave the main highway, a two-lane road leads us to a geothermal field. Approaching the

* The boiling point of water increases to about 450, 600, and 1,110 degrees Fahrenheit at the depths of 1,000, 5,000, and 10,000 feet respectively.

plant located on this field, we come into an area laced with big steam pipes going from the geothermal wells into the generating plants. More pipes can be seen bringing steam from the wells on nearby hills. At regular intervals the pipes have loops in them. We learn that these loops allow for expansion and contraction of the huge pipes as they heat and cool.

Near the village are the offices of Philippine Geothermal, Inc., where the operations process manager, Roman St. Maria, welcomes us. Soon we begin our guided tour of the site with Roman.

Close by the offices are some production wells. "We utilize the same technology that is used for drilling oil wells," says Roman, "except that the holes are larger in diameter." He continues: "The wells, in fact, become the conduits through which pressurized hot water and steam are brought to the surface. And that is the product we deliver to the power plant." Two nearby wells are very close to each other. When we ask why, our guide explains: "Only on the surface are they close. Underground, one is straight down. The other allows us to control its direction. This is necessary because of the cost of land. Drilling wells close together helps us to save on expenses."

Wanting to know more about the process, we ask: "We have read that you use flash-steam technology at this site. What does that mean?" Roman

Crossword Solutions

O	B	A	D	I	A	H	C	E	C	R
B	O	O	H	O	L	Y	O	N	E	
E	G	R	I	T	S	A	D	Z	D	
D	L	L	T	E	L	I	M	E	L	E
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T	O	E	B	A	B	I	L	E	N	E
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U	N	S	H	O	R	N	E	V	A	
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explains: "The deepest well we have here is almost 3,700 meters [12,000 feet] in depth. Hot water is under high pressure at great depths. But when you bring it to the surface, the pressure drops and most of the water flashes, or turns into steam—thus the name flash-steam technology."

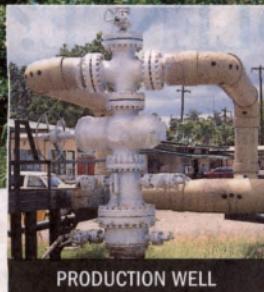
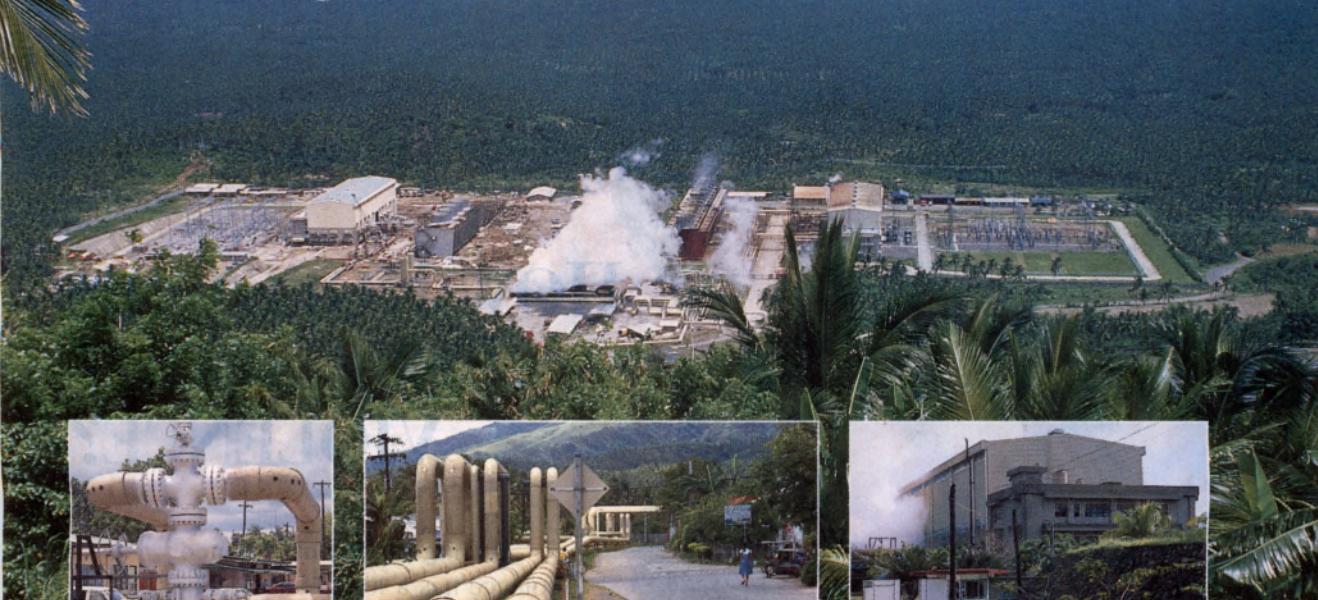
Down the pipeline from the wells is the separator. Here the steam is separated from the hot water or geothermal brine. But the steam is still not ready for power generation. Roman elaborates: "Droplets of water remain in the flowing steam. These droplets contain minerals that might deposit on the turbine and damage it. So from the separator, the steam goes to the scrubber. The job of the scrubber is to remove those droplets."

Our guide points to large insulated pipes that take the scrubbed steam to the electrical generating plant, about a half mile away. Since condensation forms along the way, the steam is given another scrubbing before it enters the turbine that drives the generator.

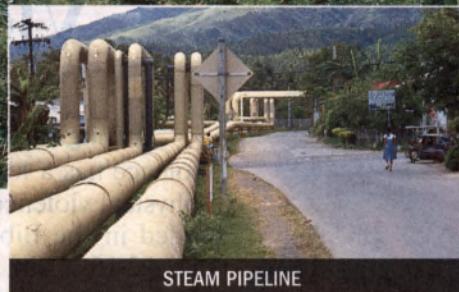
We now come to the top of a hill overlooking the geothermal site. "This field's total area is about seven square kilometers [three square miles]," points out Roman, adding: "We have 102 wells here, 63 of which are production wells. Many of the others are reinjection wells." Our next question is: "What are reinjection wells?" Roman answers: "We generate so much hot water and steam every hour that it is necessary to inject separated water back into the ground reservoir to avoid damaging the environment. One hundred percent of liquid effluent is reinjected." We learn that this reinjection also helps to recharge the geothermal field.

How does a geothermal power plant affect the overall appearance of the area? The most noticeable evidence of its existence is the steam vented from the power plant. Otherwise, what we see are coconut palms and other foliage. Many homes are also nestled in the valley below. It seems that with careful management, geothermal power can coexist with people and the environment.

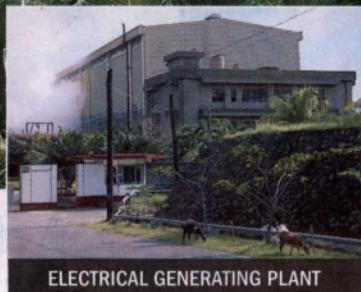
Installations such as the one we visited use only high-temperature steam for power generation. However, efforts have recently been made to extract energy from fluids that are less than 400 degrees Fahrenheit. As a result, binary-cycle technology has been developed. This method uses tapped hot fluid to vaporize a secondary fluid, which in turn drives a turbine/generator set.



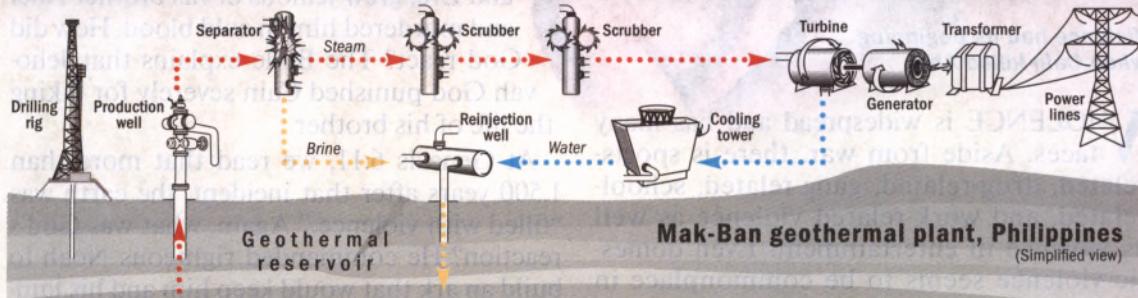
PRODUCTION WELL



STEAM PIPELINE



ELECTRICAL GENERATING PLANT



Mak-Ban geothermal plant, Philippines

(Simplified view)

Pluses and Minuses

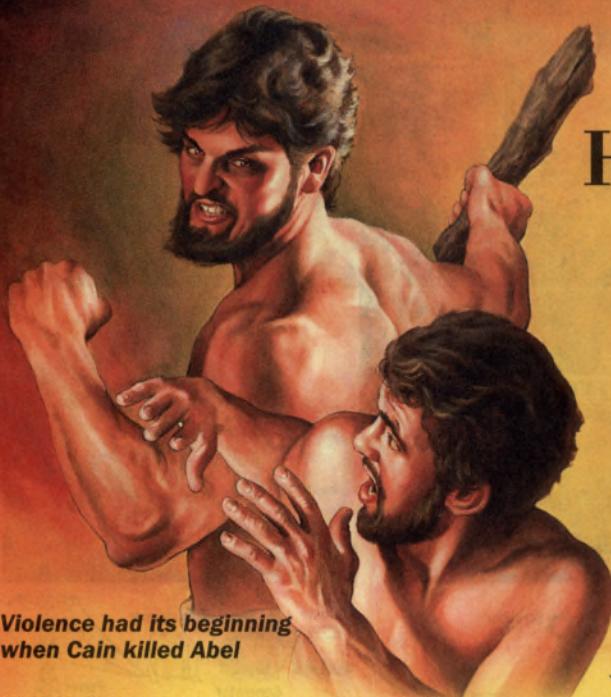
There is a lot to be said for geothermal energy. Countries that develop power from it reduce their dependence on oil. Every ten megawatts of electricity generated for a year represents a savings of 140,000 barrels of crude oil per year. Furthermore, geothermal resources are immense, and the danger of depletion is much less than it is with many other energy sources. Pollution problems are also greatly reduced. In addition, geothermal energy production costs are quite low compared with those of many other energy forms.

On the negative side, there are some environmental concerns. Geothermal steam usually contains hydrogen sulfide, which is toxic in high quantities and a nuisance in low quantities because of its sulfurous smell. However, treatment pro-

cesses for removing it are effective and more efficient than emission-control systems at fossil-fuel power plants. Moreover, particulates in the effluent may contain small amounts of arsenic or other toxic substances. When these are reinjected into the ground, the danger is kept to a minimum. Contamination of groundwater supplies can also be a problem if the geothermal wells have not been sealed to great depths with steel casings and cement.

Our Creator has given us a planet with varied treasures. Geothermal energy is just one of these. And men are only beginning to learn how to utilize it. Future developments will no doubt help us see how to use our treasures more beneficially and how at the same time to care properly for the grand globe that has been entrusted to us.—Psalm 115:16.

The Bible's Viewpoint



Violence had its beginning when Cain killed Abel

VIOLENCE is widespread and has many faces. Aside from war, there is sports-related, drug-related, gang-related, school-related, and work-related violence as well as violence in entertainment. Even domestic violence seems to be commonplace in many families. For example, one recent study suggested that in Canada 1.2 million men and women were violently attacked by their own mates at least once during a recent five-year period. Another study concluded that about 50 percent of wife batterers also violently abuse their children.

Surely, such acts of violence are as appalling to you as they are to most other people. Still, violence has become an important ingredient in much of today's entertainment. Audiences are captivated not only by make-believe violence in movies but also by televised acts of real-life physical aggression. Boxing and other violent sports are favorites in many countries. But how does God feel about violence?

HOW DOES GOD FEEL ABOUT VIOLENCE?

A Long History of Violence

Violence has a long history. The first act of physical violence by a human that is recorded in the Bible is described at Genesis 4:2-15. Cain, the first son of Adam and Eve, grew jealous of his brother Abel and murdered him in cold blood. How did God react? The Bible explains that Jehovah God punished Cain severely for taking the life of his brother.

At Genesis 6:11, we read that more than 1,500 years after that incident, the earth was "filled with violence." Again, what was God's reaction? He commanded righteous Noah to build an ark that would keep him and his family safe while Jehovah brought a deluge on the earth, thus 'bringing to ruin' that violent society.(Genesis 6:12-14, 17) But what had caused the populace to be so bent on violence?

The Influence of Demons

The Genesis account reveals that sons of God, disobedient angels, had materialized as humans, married women, and produced offspring. (Genesis 6:1-4) The offspring, known as Nephilim, were men of extraordinary size and fame. Under the influence of their demon fathers, they became violent bullies. When the floodwaters rose and covered the earth, these wicked bullies perished. But the demons apparently dematerialized and returned to the spirit realm.

The Bible makes clear that since then, these rebel angels have exerted a strong influence on humans. (Ephesians 6:12) Their leader, Satan, is called the original “manslayer.” (John 8:44) Hence, the violence that takes place on earth could properly be referred to as demonic, or satanic.

The Bible warns of the seductive power of violence. At Proverbs 16:29, it states: “A man of violence will seduce his fellow, and certainly causes him to go in a way that is not good.” Many today have been seduced into approving of, promoting, or perpetrating acts of violence. Also, millions of people have been enticed into enjoying entertainment that glorifies violence. The words of Psalm 73:6 can accurately be used to describe today’s generation. The psalmist says: “Haughtiness has served as a necklace to them; violence envelops them as a garment.”

God Hates Violence

How should Christians conduct themselves in a violent world? The Bible account of Jacob’s sons Simeon and Levi provides us with sound guidance. Their sister Dinah placed herself in the company of the immoral people of Shechem. This resulted in her being sexually violated by a Shechemite. In retaliation, Simeon and Levi wantonly slaughtered all the men of Shechem. Later, under divine inspiration Jacob cursed his sons’ uncontrolled anger with the words: “Simeon and Levi are brothers. Instruments of violence are their slaughter weapons. Into their intimate group do not come, O my soul. With their congregation do not become united.”—Genesis 49:5, 6.

In harmony with these words, Christians avoid association with those

who promote or perpetrate violence. Clearly, God hates those who promote violence. The Bible states: “Jehovah himself examines the righteous one as well as the wicked one, and anyone loving violence His soul certainly hates.” (Psalm 11:5) Christians are admonished to avoid all forms of uncontrolled anger, even verbal violence.—Galatians 5:19-21; Ephesians 4:31.

Will Violence Ever End?

The ancient prophet Habakkuk asked Jehovah God: “How long shall I call to you for aid from violence?” (Habakkuk 1:2) Perhaps you have asked a similar question. God answered Habakkuk, promising to remove “the wicked one.” (Habakkuk 3:13) The prophetic book of Isaiah also provides hope. There God promises: “No more will violence be heard in your land, despoiling or breakdown within your boundaries.”—Isaiah 60:18.

Jehovah’s Witnesses are confident that very soon God will remove from the earth all forms of violence and those who promote it. At that time, instead of being filled with violence, “the earth will be filled with the knowing of the glory of Jehovah as the waters themselves cover over the sea.”—Habakkuk 2:14.





A Mother Bear's Long Nap

BY AWAKE! WRITER
IN FINLAND



Mother bear's den

Sugar-rich berries

MIGRATING birds unerringly herald the approach of autumn in the North. To escape the freezing cold, gaily fluttering flocks of starlings and noble wedges of cranes fly southward across the sky. At the same time, the brown bear lumbering along the ground also faces cold winter weather. How will it survive when vegetation withers, the ground freezes, and everything becomes covered in a blanket of snow? It is easy for those with wings to escape, but the brown bear cannot just rush through backwoods and wilderness to a warmer climate.

The solution is quite practical. The bear will eat its nourishment for the winter during the summer and then hibernate until spring. This, however, is

not as easy as it may sound. Just imagine what sort of shape you would be in if you did not eat or drink for half a year. Let us consider some amazing phases of a mother bear's winter sleep.

Busy Summer

To be able to fast for several months, a mother bear must store energy in advance. Therefore, she does not worry about her figure. Her main goal is to have a lot of fat under her skin, in some places up to three inches of it. Although sugar-rich berries are her favorite menu item, she is not picky—anything goes. She eats roots, small mammals, fish, and ants. Finally, by autumn her weight may have increased from 280 pounds to 350 pounds, about

one third of which is fat (by then the male may weigh up to 600 pounds). Before it is time to retire to the land of dreams, she stops eating and empties her intestines. She does not eat, urinate, or defecate until about half a year later.

A good place for a den is a cave, an abandoned anthill, or a cavity beneath tree roots, as long as the place is peaceful—after all, no one likes to be disturbed while asleep. The bear gathers spruce boughs, moss, turf, and other bedding material to make her den as cozy as possible. The den is not much bigger than the stocky bulk of the bear. When winter arrives, snow will cover the den, and only the breathing hole may be visible to a sharp-eyed observer.

The Rest

Certain small mammals, such as hedgehogs, bats, and dormice, are called true hibernators because they spend most of the winter in a state similar to death, their body temperature approximating that of the environment. However, the bear's body temperature decreases only about 10 degrees Fahrenheit, so its sleep is not very deep. "It is not as if the bear were knocked out. It raises its head and changes its position basically every day," explains Professor Raimo Hissa, who has studied the winter sleep of bears for many years at the University of Oulu, in Finland. However, the bear rarely emerges from its den in the middle of the winter.

During its winter dormancy, the bear's life processes are in economy mode. Its heart rate drops to less than ten beats per minute, and the metabolic rate declines. Once the mother bear is snoring contentedly in her sleep, an essential process of burning fat begins. Fat tissue breaks down and supplies the bear's body with the necessary calories and water. In spite of reduced vital functions, however, metabolism results in a certain amount of waste products. How will she get rid of them and yet at the same time keep her den clean? Instead of disposing of her waste, her body recycles it!

Professor Hissa explains: "The nitrogen urea products are reabsorbed from the kidneys and the bladder and are transported through the circulatory system into the bowels, where bacteria hydrolyze urea to ammonia." What is even more amazing is that this ammonia goes back to the liver, where it is used to form new amino acids,

the essence of proteins. So by turning waste products into building blocks, the bear's body is nourished during the long denning period!

In the old days, people used to hunt bears in their dens. Indeed, a dozing bruin was an easy catch. First the den was located and then gradually surrounded by skiers, who formed a ring around the site. Then the bear was awakened and killed. However, nowadays winter hunting of bears has been forbidden in practically all of Europe because of its cruelty.

New Life

The male bear lounges all winter, turning easily from one side to the other, but the mother bear is up to something else. Bears mate in early summer, but the fertilized eggs inside the mother remain dormant until she goes for her winter sleep. Then the embryos implant themselves in the wall of the uterus and start growing. After only two months, in December or January, the mother bear's body temperature rises a little, and she gives birth to two or three cubs. Then her body temperature goes down, although not as low as before giving birth. The father of the cubs does not witness their birth, but if he did, it could be quite a disappointment to him. The robust male would hardly recognize these tiny weaklings, weighing less than a pound each, as his own offspring.

Mother bear feeds the cubs with her nutritious milk, which strains her energy resources even more. The cubs grow fast, and in the spring the



furry little bears already weigh about ten pounds. That means that there is quite a bit of activity in the mother bear's small apartment.

Spring

March. The cold of the winter is past, the snow melts, and the birds migrate back from the south. At the end of the month, male bears crawl out of their winter dens. The female bears, however, rest a few weeks longer; perhaps the minors have taken a toll on their strength.

After this long nap, mother bear is nothing but skin and bones compared with her sturdy appearance in the fall. The snow has melted, and so has the fat. Otherwise, she is amazingly agile—no bedsores, no cramps, no osteoporosis. She emerges from the den and after a while defecates a fecal plug, a "pitchy plug" of metabolic waste. Normally the bear does not begin to eat until after about two or three weeks, as the recovery of the organism takes some time. Then it naturally is "as hungry as a bear." However, as nature is still just awakening to the spring, there is at first nothing much to eat in the forest. The bear munches on larvae and beetles, strips old carcasses, and may even chase some reindeer.

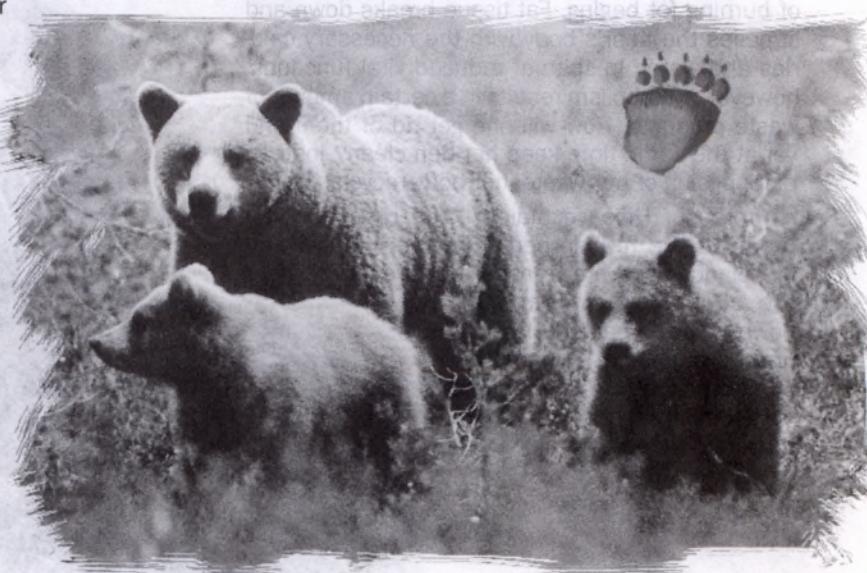
Naturally, the mother bear has to rear the cubs so that they learn to behave like bears, and they are the apple of her eye. An ancient proverb says: "Let there be an encountering by a man of a bear bereaved of its cubs rather than anyone stupid in his foolishness." (Proverbs 17:12) In other words, neither encounter is desirable. "The mother bear has a lot to do in caring for her cubs. If a male bear approaches, the mother immediately sends the cubs up a tree, as the male could harm them even [if] he is their father," Hissa explains.

Study of Bears' Winter Sleep

The Department of Zoology at the University of Oulu has for several years done physiological research on the mechanisms by which animals adapt to the cold. The study of the European brown bear began in 1988, and altogether, 20 bears have been studied since then. A specific research den was built for them in the zoological garden of the university. Computers, laboratory tests, and a video camera have been used to reveal their body temperature, metabolism, and activity as well as their blood and hormonal changes during the winter sleep. There has been cooperation with universities in other countries, even as far away as Japan. The researchers hope that the results can provide information that may even be helpful in solving problems of human physiology.

The mother bear takes the cubs with her into her lair the next winter. The year after that, the weaned cubs will have to find their own dens, as it will be time for the mother bear to give birth to a new brood of tiny little cubs.

Much has been learned about the complex and ingenious phenomena of the winter sleep of the bear, but many amazing aspects of it are still a mystery. Why does the bear become drowsy in the autumn and lose its appetite? Why does it not develop osteoporosis? It is not easy to learn the bear's secrets, and that is understandable. Everybody is entitled to some privacy!



NAVIGATING by the STARS

BY AWAKE! WRITER IN HAWAII



CENTURIES before Christopher Columbus sailed across the Atlantic Ocean, Polynesian voyagers were sailing across thousands of miles of the Pacific Ocean in wooden canoes, navigating among the islands within the Polynesian triangle. How did the ancient Polynesians discover the scores of island groups that are inside this vast region? Did they stumble onto these islands by accident?

If the Polynesians had a definite plan in mind regarding their destination, how were they able to navigate their canoes with no charts, magnetic compass, or other instruments that Western explorers used?

The answer not only reveals the ingenuity of Polynesian methods of navigation but also heightens our appreciation for the orderliness and structure of our world and the universe.

Two Early Theories

Not all scientists and scholars are ready to accept the idea that the Polynesians were able to navigate purposefully from island to island. Thor Heyerdahl, a Norwegian explorer, theorized that Polynesians were originally from South America and that the voyagers found their way to the Pacific islands by drifting along with prevailing ocean currents and winds.

To test this theory, Heyerdahl and a crew of five Scandinavians set sail from the west coast of Peru on a raft made of balsa wood. They proceeded to sail out into the Pacific Ocean until their raft was carried by the westward currents. After 101 days and 4,300 miles of sailing, Heyerdahl and his crew landed on the Raroia atoll in the Tuamotu Archipelago. Thus, in a dramatic way, Heyerdahl demonstrated the possibility that the Polynesians came from South America by drifting on prevailing ocean currents. But not all scholars were convinced by Heyerdahl's demonstration.

One such skeptic was Andrew Sharp, a historian from New Zealand. In his book *Ancient Voyagers in Polynesia*, written in 1963, he cited numerous archaeological and linguistic findings as evidence supporting the more conventional view among historians and experts—that the Polynesians originally came from the west. However, he also discounted any views that credited the Polynesians with being great voyagers.

While Sharp allowed for the possibility that the voyagers were able to guide themselves on short trips, he claimed that there was no way that the Polynesians could have had any firm idea where they were headed for a journey beyond 300 miles. He felt that any islands they encountered over a longer trip were located purely by chance.

Experimental Voyages

Believing that Heyerdahl and Sharp had not given enough credit to the ancient Polynesians as voyagers and navigators, Dr. David Lewis, from New Zealand, decided to demonstrate the validity of ancient navigational methods. Sailing on a modern catamaran with no compass and navigating only by the stars, sun, and ocean swells, he successfully sailed from Tahiti to New Zealand in 1965, a voyage of over 1,700 miles! Lewis' journey stimulated interest in traditional navigational techniques and ancient migration routes. One person who took notice of this accomplishment was Ben Finney.

A professor of anthropology at the University of Hawaii, Finney had studied ancient Polynesian canoe design and building for many years. He and a few of his colleagues at the Polynesian Voyaging Society built a 60-foot-long double-hulled canoe, which they named *Hokule'a*, a Hawaiian word meaning "Star of Joy." Although the *Hokule'a* was made of synthetic materials instead of traditional ones such as koa wood, the vessel was designed to replicate ancient canoes in build, appearance, and performance.

The maiden voyage of the *Hokule'a* took place on May 1, 1976, when it departed from the Hawaiian island of Maui and headed toward Tahiti. Because the Polynesian art of finding one's way and navigating by the stars had been lost, navigating expertise had to be found outside the Hawaiian Islands. Thus, Mau Piailug, a master navigator from Micronesia, was chosen to guide the *Hokule'a* on its initial trip. It took the *Hokule'a* 31 days to complete the voyage of several thousand miles to Tahiti.

The successful trip sparked a cultural revival throughout Polynesia and a renewed interest in ancient navigation and canoe-building. In the years that followed, similar voyages were made between islands in the Polynesian triangle, such as Hawaii, New Zealand (also known as Aotearoa), Rarotonga (in the Cook Islands), and Easter Island (also known as Rapa Nui). Many of these voyages were led by Nainoa

Thompson, a Hawaiian-born navigator who studied under Piailug.

Ancient Methods of Navigation

Just how did the Polynesians successfully navigate over thousands of miles without instruments? According to Dennis Kawahara of the Polynesian Voyaging Society, the sun was the main guide. The exact points where it rises and sets indicate the directional points during the daytime. At night, the navigator directs the course of the canoe by using the rising and setting points of the stars.

Even if there is no star rising or setting in the particular direction that the canoe is headed, other stars in the sky can be used as points of reference. Besides the stars, navigators also use the moon and the five visible planets as additional aids for staying on course.

During midday and on cloudy nights when no stars are visible, the navigator can guide the canoe using winds and ocean swells (in relation to the rising and setting points of the sun). According to Kawahara, "swells are waves that have travelled beyond the wind systems or storms that have generated them, or waves that persist after the generating storm has died away."

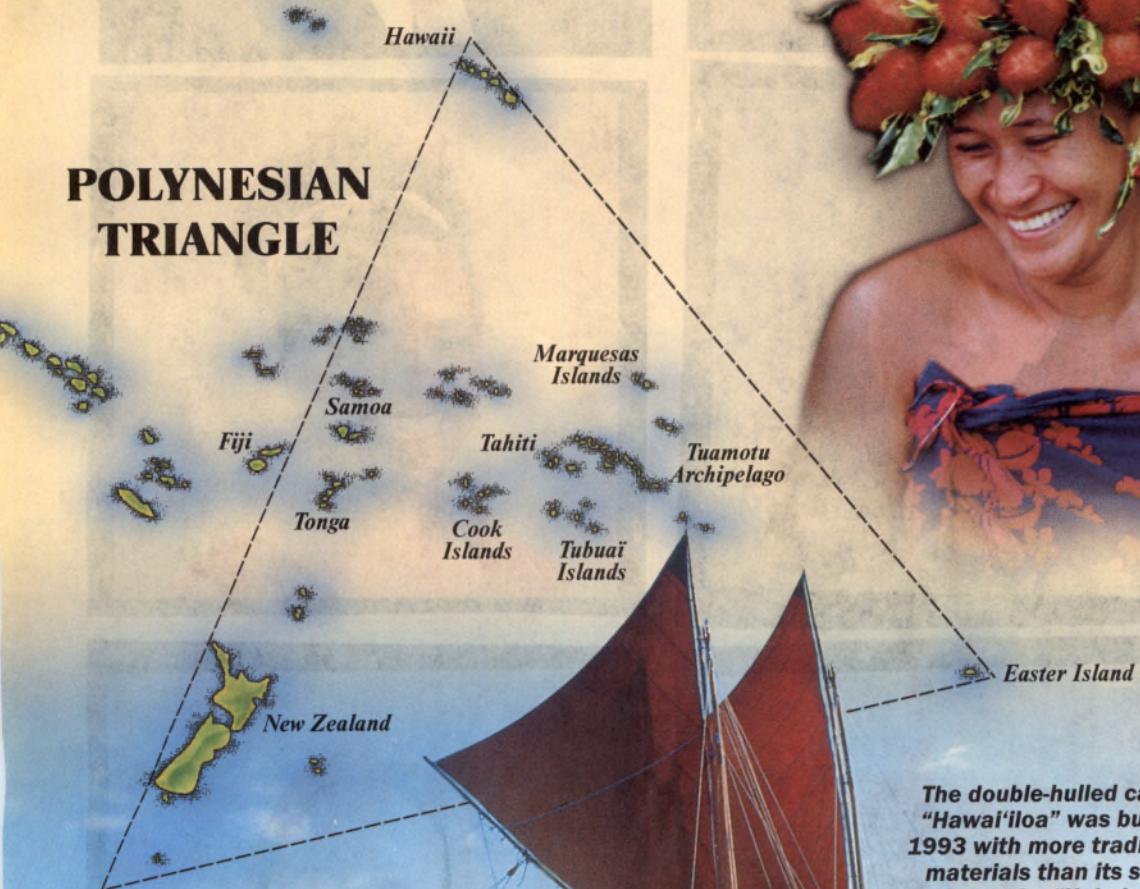
Therefore, swell patterns are a more reliable point of reference than waves, which are generated by variable local winds. Because the swells move in a straight direction, the navigator can orient the canoe to head in a desired direction. The physical motion of the canoe as it travels into or against the ocean swells tells the navigator if the vessel is headed in the proper direction.

Evidence suggests that the ancient Polynesians were able to use celestial bodies and forces of nature to navigate their canoes deliberately over thousands of miles. But as ingenious as the navigators were, none of their methods would have worked if there had not been patterns that governed the indicators they used, such as the rising and setting point of the stars.

Over 2,700 years ago, the prophet Isaiah gave credit to the Grand Creator, Jehovah God, for the orderliness that is seen in the sky, when he wrote: "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. Due to the abundance of dynamic energy, he also being vigorous in power, not one of them is missing."—Isaiah 40:26; Psalm 19:1.

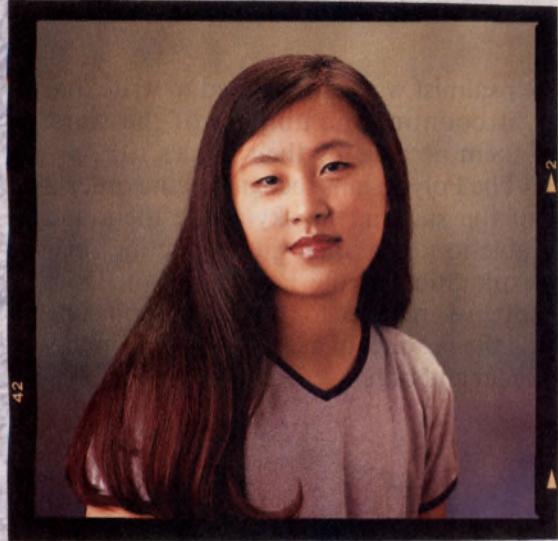
The psalmist was also inspired to write that God "is counting the number of the stars; all of them he calls by their names." (Psalm 147:4) The Polynesians recognized the orderliness of the stars in the sky above them and were able to utilize them in conducting their vast exploration of the Pacific Ocean. Does this not give credence to the idea that our universe is the product of a Creator who is highly intelligent and organized?

POLYNESIAN TRIANGLE



The double-hulled canoe "Hawai'i'loa" was built in 1993 with more traditional materials than its sister boat, the "Hokule'a"





DO YOU WORRY ABOUT YOUR HAIR?



YOU may be one of many who spend time each day in front of a mirror carefully inspecting their hair. Men and women alike are interested in their hair, and sometimes it can be a source of worry.

Know Your Hair

Do you know how many hairs your scalp contains? On the average, about 100,000. An individual hair continues to grow for only two to six years, not endlessly. It then falls out, and after an interval a new hair starts to grow from the same pore. The life cycle of an individual hair is called a hair cycle. (See the box on page 27.) Because of this cycle, even if one does not have a hair problem, some 70 to 100 hairs fall out naturally every day.

What causes the variety we observe in hair color? *The World Book Encyclopedia* explains: "The color of hair is determined largely by the amount and distribution of a brown-black pigment called *melanin*." Melanin is a biological pigment that is found in hair, skin, and eyes. The greater the amount of the pigment, the darker the hair will be. As the amount of melanin lessens, the hair color varies from black to brown or rust or blond. If hair contains no melanin at all, it looks shiny white.

What concerns many, apart from dandruff, is either a loss of hair or gray hair.

Do You Have Gray Hair?

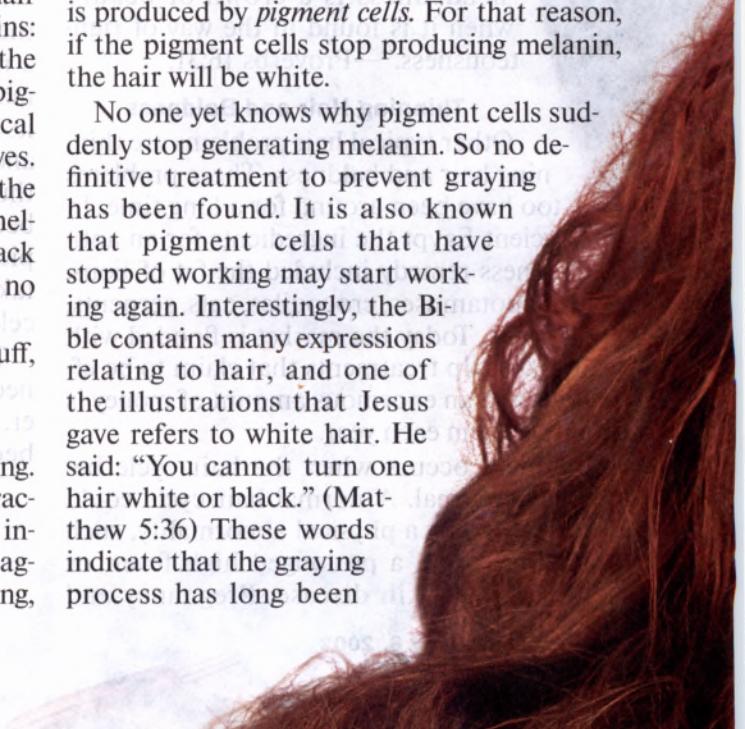
Gray hair is often viewed as a sign of aging. And white hair is usually viewed as a characteristic of older people. True, white hair increases with aging. However, in addition to aging, other factors, such as excessive dieting,

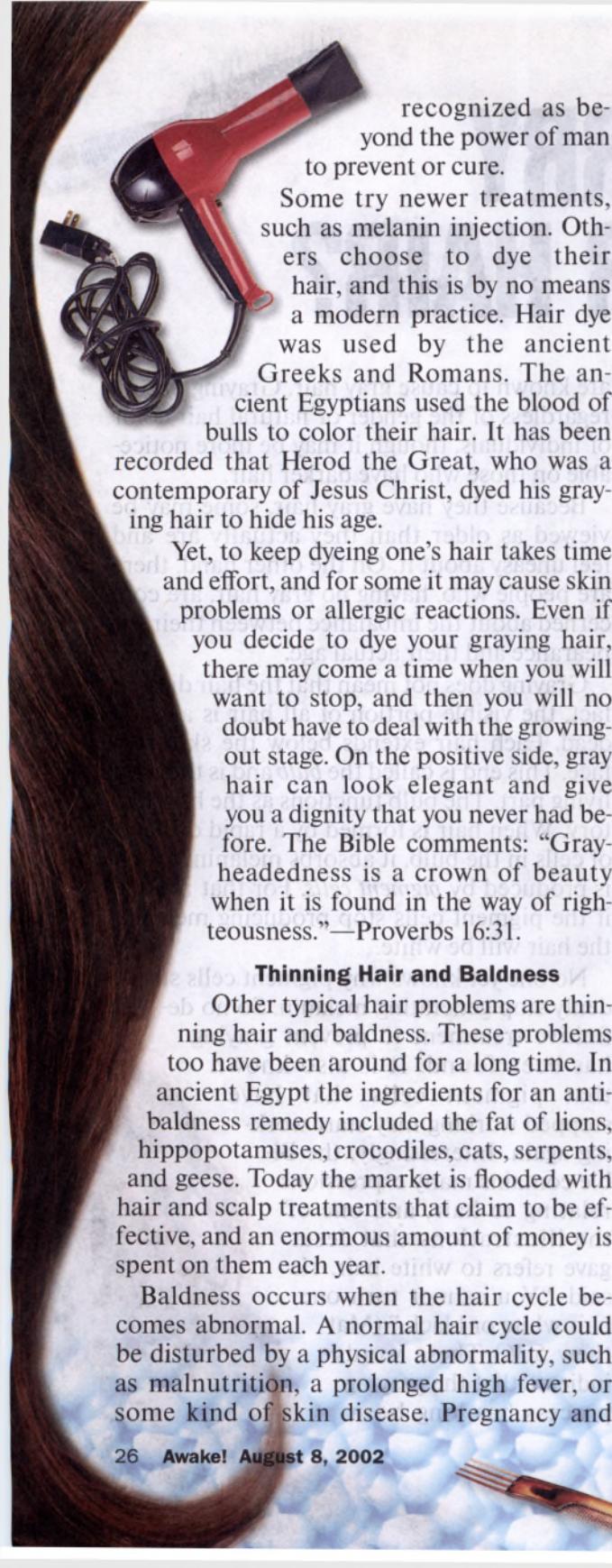
are known to cause gray hair. Graying occurs regardless of the gender or natural hair color of individuals, though it may be more noticeable on those who have darker hair.

Because they have gray hair, some may be viewed as older than they actually are and feel uneasy about it. On the other hand, there are people who, having no gray hair, are concerned about the imbalance between their appearance and their actual age.

Graying does not mean that the hair dies. In fact, the visible portion of all hair is already dead. Each hair extends below the skin surface. This end is called the *bulb* and is the only living part. The bulb functions as the hair factory. When hair is formed by a rapid division of cells in the bulb, it absorbs melanin, which is produced by *pigment cells*. For that reason, if the pigment cells stop producing melanin, the hair will be white.

No one yet knows why pigment cells suddenly stop generating melanin. So no definitive treatment to prevent graying has been found. It is also known that pigment cells that have stopped working may start working again. Interestingly, the Bible contains many expressions relating to hair, and one of the illustrations that Jesus gave refers to white hair. He said: "You cannot turn one hair white or black." (Matthew 5:36) These words indicate that the graying process has long been





recognized as beyond the power of man to prevent or cure.

Some try newer treatments, such as melanin injection. Others choose to dye their hair, and this is by no means a modern practice. Hair dye was used by the ancient Greeks and Romans. The ancient Egyptians used the blood of bulls to color their hair. It has been recorded that Herod the Great, who was a contemporary of Jesus Christ, dyed his graying hair to hide his age.

Yet, to keep dyeing one's hair takes time and effort, and for some it may cause skin problems or allergic reactions. Even if you decide to dye your graying hair, there may come a time when you will want to stop, and then you will no doubt have to deal with the growing-out stage. On the positive side, gray hair can look elegant and give you a dignity that you never had before. The Bible comments: "Gray-headedness is a crown of beauty when it is found in the way of righteousness."—Proverbs 16:31.

Thinning Hair and Baldness

Other typical hair problems are thinning hair and baldness. These problems too have been around for a long time. In ancient Egypt the ingredients for an anti-baldness remedy included the fat of lions, hippopotamuses, crocodiles, cats, serpents, and geese. Today the market is flooded with hair and scalp treatments that claim to be effective, and an enormous amount of money is spent on them each year.

Baldness occurs when the hair cycle becomes abnormal. A normal hair cycle could be disturbed by a physical abnormality, such as malnutrition, a prolonged high fever, or some kind of skin disease. Pregnancy and

childbirth can also affect the hair cycle, so that the scalp sheds much hair before completing the normal cycle. When the causes are no longer present, however, this type of hair loss stops and the hair cycle becomes normal again.

Another type of hair loss is called alopecia.* Often, with this problem, hair loss is experienced in patches on the scalp. Recent medical research suggests that alopecia is probably a disorder of the immune system.

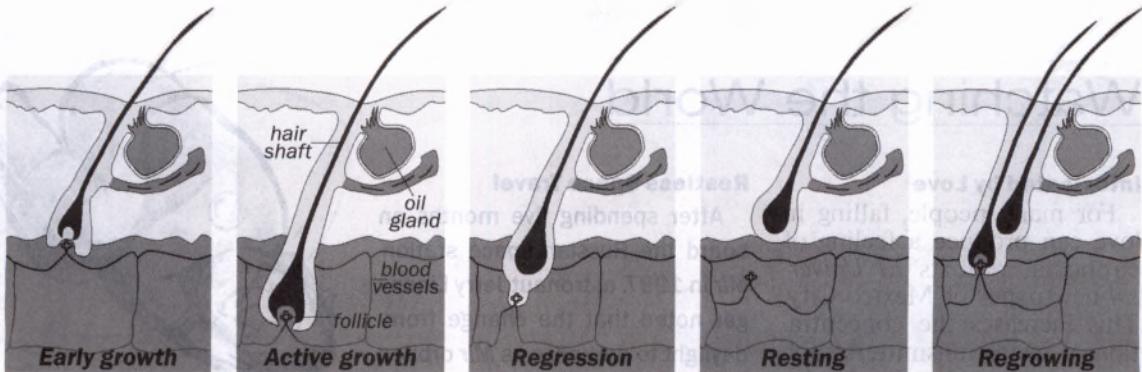
The most common hair thinning is called male pattern baldness. As is indicated by its name, this occurs in men. It starts with the recession of the front hairline or the thinning of the crown, and it progresses gradually. The hair cycle becomes abnormal in the affected area and will eventually stop. *The Encyclopædia Britannica* explains: "On the affected areas of the scalp a downy hair called vellus replaces the former long, sturdy, pigmented terminal hair." This means that as the hair cycles continue, the hair becomes thinner and short-lived and that eventually none will grow. This is the result of a combination of hereditary traits and male hormones.

Male pattern baldness may begin as early as the teens, but it is more likely to occur when a man is in his late 30's or his 40's. Though many males experience this type of hair loss, its occurrence rate varies from race to race and individual to individual. Unfortunately, thus far no absolute cure for this ailment has been found. Some may choose to wear a hairpiece or undergo hair transplants. For many, taking good care of the remaining hair to decelerate hair loss may help.

To say that one's hair is thinning does not necessarily mean that hair is being lost. Rather, it can mean that the individual hairs are becoming finer, or thinner.

* See *Awake!* of April 22, 1991, page 12.





HAIR CYCLE

The growth of our hair is cyclic. It consists of a growing phase, a short transition phase, and a resting phase. *The World Book Encyclopedia* explains: "A hair stops growing during every resting phase, when it is known as a *club hair*. The club hair remains in the resting follicle until the next growing phase. During the growing phase, the club hair is shed as a new hair grows and pushes it out of the follicle." At any given time, while 85 to 90 percent of hairs are in the active phase, 10 to 15 percent will be in the resting phase and 1 percent in the transition phase.

and thus the hair is losing its volume. How thick is a hair? According to a survey, it can vary from 50 microns in some people to 100 microns in others.* Hair becomes thinner as one ages. Just a few microns' difference may not seem significant. But please recall that there are 100,000 hairs. So just a slight thinning of individual hairs results in a big difference in the total volume.

Care for Your Hair

Hair grows more than three eighths of an inch per month, and it is one of the quickest developing parts of the body. When the growth of all the hairs is combined, it reaches more than 60 feet per day!

Although no radical cures for gray hair and baldness have yet been found, we can do much to take care of the hair we have. Taking in sufficient nutrition and improving blood circulation to the scalp are essential. Extreme dieting

or eating unbalanced meals may accelerate hair graying and hair thinning. Professionals suggest that we shampoo our hair regularly and massage our scalp, avoiding scratching it with our nails. This prompts proper blood circulation to the scalp. After shampooing your hair, rinse it thoroughly.

Do not brush your hair with too much force. If you have long hair, it is better initially not to brush through from the root to the end. Rather, first hold your hair and use

the brush to untangle the ends. Next, brush from the middle to the end. Then, finally let your hair down slowly and brush from the root to the end.

Finding gray hairs or many fallen hairs may cause you concern. Yet, remember that others are not usually as concerned about your hair as you are. It is your choice whether to dye or not, to use a hairpiece or not, or to seek other treatment. Whatever your hair color and whatever the amount of hair you have, what is important is to keep it clean and groomed.

In Our Next Issue

- Garbage—Will It Burry Us?
- Automobile Accidents—Are You Safe?
- Should I Have Cosmetic Surgery?

* One micron is one thousandth of a millimeter.

Watching the World

Intoxicated by Love

For many people, falling in love can produce a feeling of euphoria, reports *El Universal* newspaper of Mexico City. This increases the concentration of neurotransmitters such as dopamine in the brain. Family psychologist Giuseppe Amara notes that some people, not wanting to lose this intoxicating sensation, go from one infatuation to another without establishing a lasting relationship. The euphoric effect can last from months to as long as two years. Then these feelings gradually calm down, and the person can enter the next stage, in which a hormone called oxytocin increases, generating a feeling of warmth and deep attachment. Although the euphoric stage of romantic love is very pleasant, notes Amara, it can cloud one's judgment, preventing one from seeing the defects of another. Therefore, states *El Universal*, specialists recommend that couples not marry until they "know each other sufficiently to maintain a good relationship."

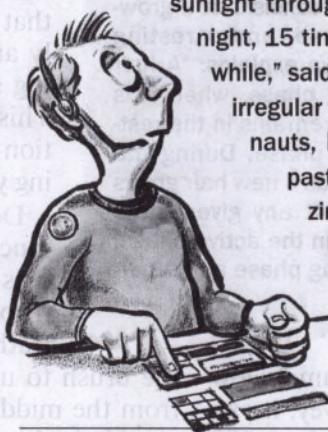
Separation and Divorce Skyrocket in Spain

"We don't have to resign ourselves to one marriage all our lives," states Inés Alberdi, sociologist and author of the book *La nueva familia española* (The New Spanish Family). As reported in the newspaper *El País*, many Spanish couples evidently feel the same way. A recent study by the Ministry of Justice shows a separation or divorce for every two marriages in Spain. Experts predict that such breakups will

Restless Space Travel

After spending five months on board the Russian space station *Mir* in 1997, astronaut Jerry Linenger noted that the change from daylight to darkness as *Mir* orbited the earth every 90 minutes played havoc with his sleep patterns. Why?

Efforts to conserve energy meant that *Mir*'s main light came from sunlight through the windows. Thus, "day, night, day, night, 15 times a day starts messing you up after a while," said Linenger. Speaking of the results of the irregular sleep patterns of two of his fellow astronauts, he said: "They'd nod off and float right past you." According to *New Scientist* magazine, finding ways to keep astronauts' daily rhythms on track "will be vital to the success of future long-haul missions." Otherwise, "stopping astronauts from nodding off could be a major problem on long space flights."



Risks of Body Piercing

Piercing various body parts for the wearing of jewelry is very popular, especially among youths. "Unfortunately, they seldom think about the consequences of this step," says the Polish magazine *Świat Kobiety*. "The period of youthful rebelliousness passes, and an eyebrow studded with pieces of metal stops being considered an ornament." And although the metal may be removed, scars will remain. Additionally, piercing facial skin can damage nerves and blood vessels and result in "loss of feeling" as well as "infections and wounds that take a long time to heal." Bacteria thrive in the "damp and warm environment" of the

mouth, so piercings there often lead to infections and even tooth decay. Fat cysts in the form of hard papules can develop in pierced areas rich in fat cells, such as the navel and the ears. The article warns that "metal ornaments often contain an admixture of nickel. People allergic to that metal may experience allergic symptoms, such as swelling and an itchy rash."

"Trashy Cosmetic Surgery"

Over the past ten years, law-suits following botched-up cosmetic surgery have soared by 117 percent in France, comments the newsmagazine *Le Point*, with 1 case in every 3 involving breast surgery. According to specialists, up to 30 per-

cent of cosmetic operations require further adjustments, and some patients have even died from postoperative complications. Denouncing what he calls "trashy cosmetic surgery," Dr. Pierre Nahon, himself a plastic surgeon, states: "We can all perform in 20 minutes an operation that normally takes two hours. But the result is not the same." According to *Le Point*, "some clinics take more care in choosing their lawyers than their surgeons."

Concern About Health Care in Europe

Dissatisfaction with health services is running high in some European lands. European Commission figures indicate that many people in Portu-

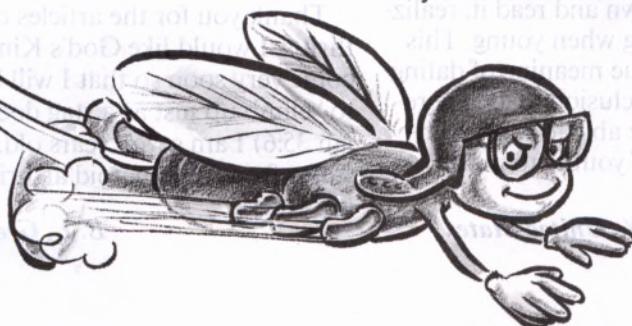
gal, Greece, and Italy feel that their health care is inadequate. European health services are admittedly under great strain. As the number of aged people in the population increases, more and more people are developing diseases such as Alzheimer's. On the other hand, health officials feel that Europeans could take better care of their health. According to the newsletter *EUR-OP News*, "dining, sedentary lifestyles and excessive intake of saturated fats have been highlighted as dangerous trends," and "the number of overweight men and underweight women . . . is on the increase."

Violence Against Vicars

"Aggressive middle-class parishioners are abusing and assaulting vicars after losing their tempers in disputes over weddings and christenings," reports *The Sunday Telegraph* of London. A study involving 1,300 members of the clergy in southeast England revealed that over a two-year period, more than 70 percent of them had been verbally abused, about 12 percent assaulted, and 22 percent threatened with violence. Dr. Jonathan Gabe, who led the research at London University's Royal Holloway College, blamed the problem on "parishioners who were abusive at the very least if they couldn't get their way." He also cited "an increasingly assertive consumerism and a decline in public deference and trust in public figures" as causes for unruly parishioners. Some dioceses are responding by providing training in such areas as self-defense to help clergy to deal with violent parishioners.

Fruit Flies Did It First

Creating an engine that mixes the right amount of fuel and oxygen to power an automobile at various speeds and still maintains clean exhaust is a daunting engineering challenge. Automobile designers accomplish this by using "a system of valves that can alter the flow of fuel and air instantly as power needs change," states *The New York Times*. However, researchers studying the fruit fly at the University of Würzburg in Germany have recently found that fruit flies have long used a remarkably similar method for taking in the right amount of oxygen and releasing carbon dioxide, while not losing too much water vapor. The fruit fly uses tiny openings, called spiracles, located on its thorax and abdomen to control the "proper exchange of respiratory gases while reducing water loss," states the paper. It adds that the openings "can go from wide open to fully closed, with lots of intermediate stops between, in the course of just a few seconds."



From Our Readers

Young Dating I would like to thank you very much for the article "Young People Ask . . . Young Dating—What's the Harm?" (December 22, 2001) Just the other day, I was asking my mother that same question—"What is so wrong with dating anyway?" I knew the answer, but I just needed something to make me more sure of it.

When I read the article, I felt as if Jehovah had read my mind. This article has strengthened my resolve not to date until

I am ready to get married. I have always enjoyed the way your articles come at just the right time! Once again, thank you very much.

L. F., United States

I read the article immediately, and it was so encouraging. I am in the ninth grade, and the pressure there is really strong. Virtually all my schoolmates have boyfriends, and they often make remarks about my not having one. So this article was really necessary! Articles like this help us to keep clearly in mind the sound advice found in the Bible.

J. R., Finland

I am 16 years old, and the desire to go out with a person of the opposite sex—even just to be appreciated or noticed—is strong. However, I have thought hard about it, and I understand that it is important to be mature enough before dating. This will help us to avoid dangers and not take on responsibilities that we don't know how to handle.

A. G., Italy

I am 16 years old. This article was on time for me and also my friends. We all sat down and read it, realizing that there are dangers in dating when young. This article also helped us to see the true meaning of dating and the Bible's view of it. The conclusion made me realize that if I wait to date, I will be able to grow spiritually and I can use "the bloom of youth" to make such growth.—1 Corinthians 7:36.

R.L.W., United States

Life Story I thought that I must write to tell you how much I appreciated the article entitled "Sustained by Confidence in God." (December 22, 2001) The experience of Rachel Sacksioni-Levee illustrates how Jehovah God sustains his servants through their ordeals. As conditions in the world deteriorate, experiences like this one help us to keep on doing the will of God despite our trials.

J. F., Britain

Arthritis Thank you very much for the series on arthritis. (December 8, 2001) I am 19 years old and learned that I had arthritis when I was 8. The pain I feel is constant, although some days it is stronger than others. My source of comfort is the hope of life in God's new world, when we will be free from all debilitating diseases. Until that time comes, I am confident that he will give me the strength I need to endure this painful disease.

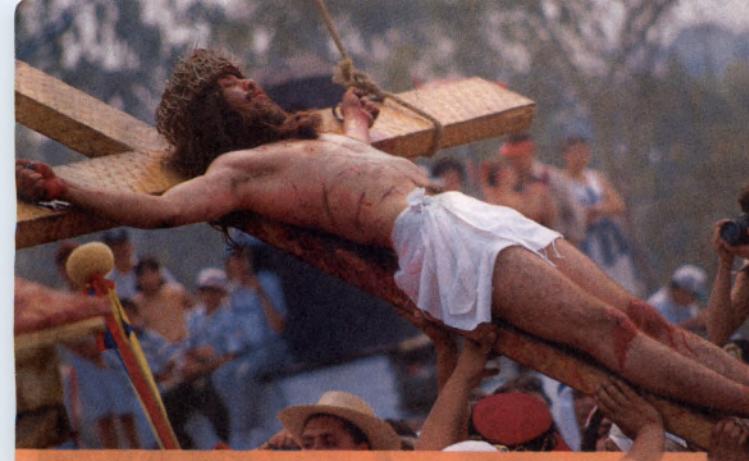
M. R., Brazil

The information in this series was most interesting. I am 28 years old, and for the last three years, I have been suffering from a very rare form of arthritis. With the hope offered by these articles, I am able to go on serving Jehovah.

M. U., Italy

Thank you for the articles on arthritis. I would like God's Kingdom to come very soon so that I will be able to "climb up just as a stag does." (Isaiah 35:6) I am seven years old, and I suffer from rheumatoid arthritis in my knees.

E. I., Greece



Vía Crucis Festivities in Mexico

BY AWAKE! WRITER IN MEXICO

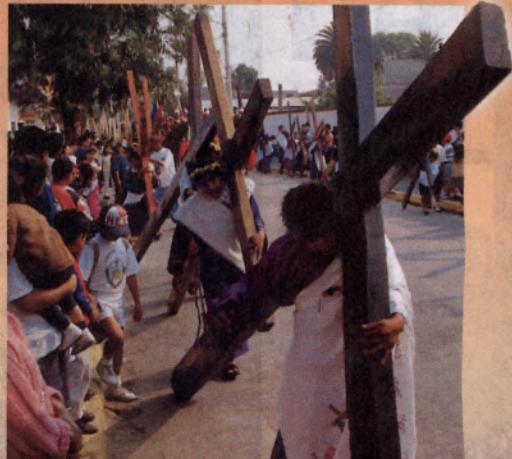
TO COMMEMORATE the death of Jesus, some 300 religious festivals are held each year in Mexico. One of the largest is the *Vía Crucis*, with its processions and portrayals of the final days of Jesus' life. *Vía Crucis* comes from Latin and means "Way of the Cross." In the Iztapalapa district of Mexico City, the director of the local House of Culture explains its origin: 'In 1833, Iztapalapa had a cholera epidemic. To mitigate the devastation, the live performance of the Passion by members of the community was initiated.'

This is how a typical *Vía Crucis* takes place: Throng of people congregate to see a portrayal of the Jewish leaders, the centurions, Jesus' apostles, and the women who followed him, including Mary. A young man plays the role of Jesus. He has memorized Bible passages to quote as events unfold. The actors use wigs, beards, and mustaches and dress up in thick robes. "Nazarenes" also follow "Jesus," barefoot or in leather sandals, wearing crowns of thorns to imitate the suffering Jesus experienced. At times, these number up to 2,500. During the day they carry crosses up to Cerro de la Estrella (Star Hill), the place selected to "crucify" Jesus.

Vendors hawk such products as hats, beverages, religious figures to be stenciled onto cheeks or arms, balloons, candy for the children, and a great many other things. Even amusement-park rides are set up for the occasion.

In the city of Querétaro, penitents attempt to walk with their feet in chains. In Taxco, men carry bundles of thorns weighing 90 to 100 pounds on their backs for almost five hours. Others follow in the procession scourging their own bodies. Often a number of these participants end up in the hospital.

This type of worship may remind us of the apostle Paul's words when he spoke against "a self-imposed form of worship and mock humility, a severe treatment of the body." (Colossians 2:23) True Christians indeed commemorate Christ's death, but they avoid traditions that are rooted in falsehood and that conflict with Bible principles.



Finding Treasure in a Church Basement

Last year a woman in upstate New York, U.S.A., reported making such a find. In her letter addressed "To Whom It May Concern," she wrote: "I found this little book in a local church basement, so I took it home. It is entitled *You Can Live Forever in Paradise on Earth*."

The woman explained: "As of today, I have four chapters to go to finish reading the book through the second time. It was so interesting that I had to read it the second time, and slower, to make everything sink in. I have learned more from that book than I ever have in my local church. And I learned things that I never knew before.

I wish I had more little books like that one."

