

Awake!

SEPTEMBER 22, 2004

Infertility The Treatments, The Questions

Awake!

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Infertility

The Treatments,
The Questions **3-11**

Assisted reproductive technology has given hope to many infertile couples who want to have a child. Does it matter which method or procedure is chosen?



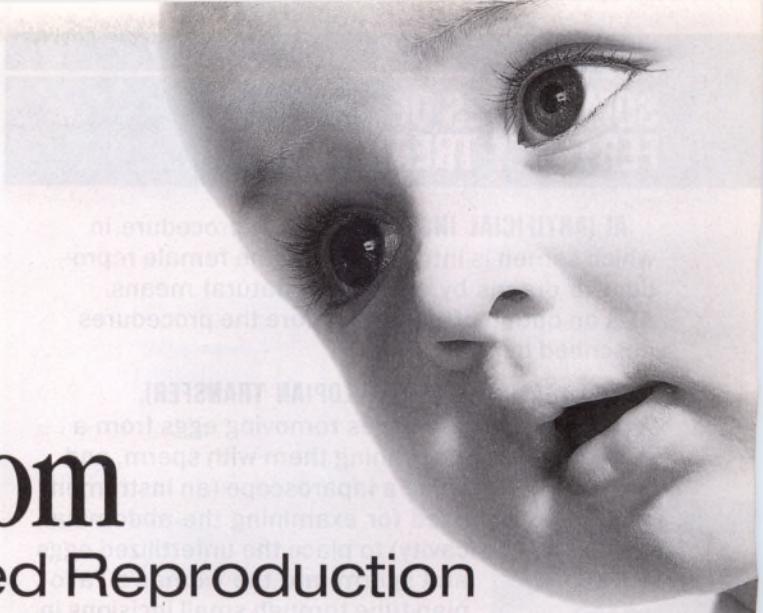
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What is binge drinking?
What are the dangers
of alcohol abuse especially
among the young?



Life Under the Big Top 18

A boy learns valuable lessons as he spends the first ten years of his life in the circus.



and it is important for us to know what
life needs best because one of the
most important parts of our
lives is to have children.

ART is used mainly in IVF, which
involves removing eggs from a woman's
ovary and fertilizing them with sperm
from a man. The resulting embryos
are then implanted back into the woman's
uterus, where they can grow into a
pregnancy.

A Baby Boom

Through Assisted Reproduction

On July 25, 1978, a unique birth took place in Oldham, England, when a baby girl named Louise Joy Brown entered the world. Louise was history's first test-tube baby.

IN months earlier, Louise had been conceived in a laboratory through a process called in vitro fertilization (IVF). By means of this procedure, an egg extracted from her mother was united with a sperm in a glass dish. Two and a half days later, after the egg cell had subdivided into eight microscopic cells, this little cluster of dividing cells was inserted into her mother's uterus to develop normally. Louise's birth opened up a whole new chapter in the treatment of infertility.

IVF gave momentum to what is now known as assisted reproductive technology (ART), which includes all kinds of fertility treatments in which both egg and sperm are handled. Consider some examples. In 1984 a woman in California, U.S.A., gave birth to a baby developed from an egg donated by another woman. The same year, in Australia, a baby

was born from an embryo that had been frozen. In 1994 a 62-year-old woman in Italy gave birth, using donated eggs and her husband's sperm.

A Progressive Development

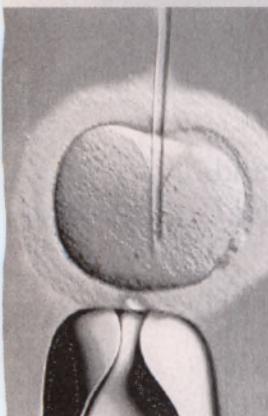
Now, some 25 years after Louise Joy Brown was born, researchers have assembled a battery of medicines and high-tech procedures that have utterly transformed infertility treatment. (See the boxes "Some Types of Fertility Treatments" and "What Are the Risks?") Such breakthroughs have led to a dramatic increase in the number of children born by means of assisted reproduction. In 1999, for example, ART resulted in the birth of over 30,000 babies in the United States alone. In some Scandinavian countries, between 2 and 3 percent of the children born each year have been conceived by such means. Worldwide, about 100,000 children are born annually

SOME TYPES OF FERTILITY TREATMENTS

AI (ARTIFICIAL INSEMINATION). A procedure in which semen is introduced into the female reproductive organs by other than natural means. AI is an option often tried before the procedures described below.

GIFT (GAMETE INTRAFALLOPIAN TRANSFER).

A procedure that involves removing eggs from a woman's ovary, combining them with sperm, and using a laparoscope (an instrument used for examining the abdominal cavity) to place the unfertilized eggs and sperm into the woman's Fallopian tube through small incisions in her abdomen.



ICSI (INTRACYTOPLASMIC SPERM INJECTION). (Shown magnified at left)

A procedure in which a single sperm is injected directly into an egg.

IVF (IN VITRO FERTILIZATION).

A procedure that involves removing eggs from a woman's ovaries and fertilizing them outside her body.

The resulting embryos are then transferred into her uterus through the cervix.

ZIFT (ZYGOTE INTRAFALLOPIAN TRANSFER).

A procedure in which eggs are collected from a woman's ovary and fertilized outside her body. A resulting fertilized egg is then inserted into her Fallopian tube through a small incision in her abdomen.

Box based on Reproductive Health Information Source, U.S. Centers for Disease Control and Prevention.

as a result of IVF treatment. It has been estimated that about one million such children have been born since 1978.

ART is used mainly in developed countries. Each treatment, or cycle, costs thousands of dollars, and national health services, employer-sponsored plans, and private insurances do not usually cover the costs. *Time* magazine noted that "a 45-year-old woman who has gone through seven cycles of IVF can easily spend \$100,000 on treatment." Nevertheless, assisted reproduction gives hope to many infertile couples whose only alternative when it comes to having children has been adoption. Now the various infertility techniques address many of the female and male causes of infertility.*

Why So Popular?

One reason for the popularity of assisted reproduction is the modern life-style. A report published by the American Society for Reproductive Medicine states: "The average age of childbearing has increased over the past three decades as more women have pursued higher education and careers and postponed mar-

* Among the causes of female infertility are an ovulation disorder, blocked Fallopian tubes, or endometriosis. Male infertility is often associated with little or no sperm production.

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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riage. Concurrently, a large cohort of women born during the 'Baby Boom' (1946-1964) have reached their late reproductive years, resulting in more women in this age group seeking assistance for infertility."

Some women may not realize how quickly their fertility declines as they get older. According to the U.S. Centers for Disease Control and Prevention, by the time a woman is 42 years old, her chances of having a baby using her own eggs are less than 10 percent. Donor eggs are thus often used for older women seeking ART treatment.

In a new twist, some infertile couples resort to embryo "adoption," obtaining an embryo left over from the infertility treatment of another couple. It is estimated that in the United States alone, about 200,000 frozen embryos are being stored. A CBS news report recently revealed: "Embryo donation has been quietly taking place on a small scale for years."

Not surprisingly, the developments in the field of assisted reproduction raise a number of questions. How may this kind of childbearing be viewed from an ethical and moral standpoint? What is the Bible view on this matter? These and other questions will be discussed in the next article.

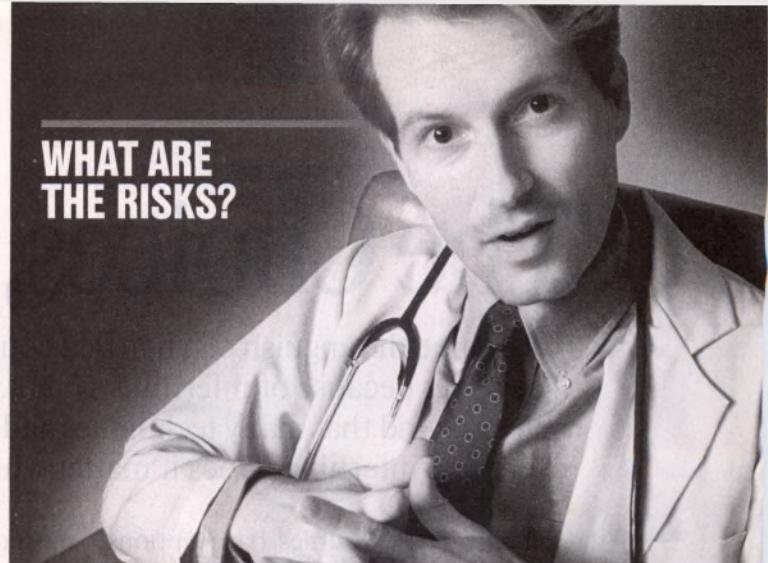
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¹ Audiocassettes also available.

² CD (MP3 format) also available.

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WHAT ARE THE RISKS?



HUMAN ERROR. In the United States, the Netherlands, and Great Britain, fertility clinics have by mistake mixed up sperm and embryos. In one case a couple got twins of another race, and in another case a woman gave birth to twins who were of two different races.

MULTIPLE BIRTHS. Studies have shown that multiple births—a result of multiple embryos transferred into the womb—increase the chances of premature birth, low birth weight, stillbirth, and long-term disability.

BIRTH DEFECTS. According to one study, children conceived through in vitro fertilization have an increased risk of birth defects, such as heart or kidney problems, cleft palate, and undescended testicles.

MOTHERS' HEALTH. Complications from hormonal treatment or a multiple-fetus pregnancy increase the risks for mothers.

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Would you welcome more information? Write Jehovah's Witnesses at the appropriate address: **America:** United States of Wallkill, NY 12589. **Australia:** Box 280, Ingleburn, NSW 1890. **Britain:** The Ridgeway, London NW7 1RN. **Canada:** Box 4100, Halton Hills (Georgetown), Ontario L7G 4Y4. **Ghana:** P. O. Box GP 760, Accra. **Jamaica:** P. O. Box 103, Old Harbour, St. Catherine. **New Zealand:** P.O. Box 75-142, Manurewa. **Nigeria:** P.M.B. 1090, Benin City 300001, Edo State. **South Africa:** Private Bag X2067, Krugersdorp, 1740. **Zambia:** Box 33459, Lusaka 10101. **Zimbabwe:** Private Bag WG-5001, Westgate.

The Choices, The Issues

Imagine the anguish of a married couple who desperately want to have a child yet because of infertility cannot. They look to medical science for help and find that many techniques and therapies have been developed to overcome infertility. Does it matter which one they choose, if any?

TODAY infertile couples have options that were not available just decades ago. But along with the choices comes a serious question, What are the ethical and moral implications of assisted reproductive techniques? Before we consider that, though, let us see how various religious groups view such treatments.

What Do Religious Groups Say?

In 1987 the Catholic Church issued a document that addressed the morality of fertility procedures. The statement, known as *Donum Vitae* (The Gift of Life), held that if a medical technique *assists* the marriage act in achieving conception, such a treatment may be viewed as moral. On the other hand, the document indicated that if a medical procedure *replaces* the marriage act, such a treatment is morally wrong. According to this view, surgery to correct tubal blockage and the use of fertility drugs would be considered moral, but test-tube fertilization would be immoral.

The following year a U.S. Congressional committee surveyed religious groups as to their stand regarding fertility treatment. The final report showed that a majority of them accepted traditional medical interventions, artificial insemination using the husband's sperm, and in vitro fertilization treatment, provided that both the egg and the sperm belonged to the married couple. Moreover,

most of the groups surveyed declared that the destruction of embryos, artificial insemination by a donor, and surrogate motherhood are morally wrong.*

In 1997 the European Ecumenical Commission for Church and Society (EECCS), a body of Protestant, Anglican, and Orthodox churches, indicated in a position paper that in their ranks there are divided opinions on assisted reproduction. Emphasizing that individual conscience and personal responsibility are involved, the paper stated: "The implication is that it is difficult to speak of '*the*' position of the member churches of EECCS. There is, rather, a plurality of positions."

It is evident that opinions on assisted reproduction differ a lot. The UN World Health Organization admits that the field of assisted reproductive techniques "constantly challenges social norms, moral and ethical standards and legal systems." What are some factors that people should consider before making a decision involving assisted reproduction?

What Are the Issues Involved?

A basic factor to consider is the status of a human embryo. This relates to the crucial question, When does life begin—at concep-

* The dictionary defines a surrogate mother as "a woman who becomes pregnant usually by artificial insemination or surgical implantation of a fertilized egg for the purpose of carrying the fetus to term for another woman."



Stored frozen embryos

© Firefly Productions/CORBIS

tion or later on during pregnancy? The answer would certainly affect the decision that many married couples make regarding treatment. If, for example, they believe that life begins at conception, then there are some key questions that must be considered.

- Should the couple allow doctors to follow the common procedure of fertilizing more eggs than the one or more being inserted, thus keeping a surplus stock of embryos for future use?

- What would happen to such stored embryos if the couple became unable or unwilling to have more children?

- What would happen to any stored embryos if the couple divorced or if one of them died?

- Who would shoulder the weighty responsibility for destroying such embryos?

The issue of what is to be done with unused or stored embryos cannot be dismissed lightly. Legal guidelines in certain coun-

tries now demand that the couple present a written consent specifying how the extra embryos should be handled—that is, if they should be stored, donated, used for research, or allowed to perish. Couples should be aware that in certain places it is ethically acceptable for a fertility clinic to destroy stored embryos without any written authorization if they have been abandoned for more than five years. Today, hundreds of thousands of frozen embryos are stored at clinics worldwide.

Another factor to consider is that couples may be urged to donate unused embryos for stem cell research. The American Infertility Association, for example, has encouraged couples to make their unused stored embryos available for research. One purpose of stem cell research is to find new ways of treating illnesses. But this field of research has been a subject of much controversy because the



WHAT IS A PREEMBRYO?

Human embryo at three days

(magnified about 400X)

Courtesy of the University of Utah
Andrology and IVF Laboratories

The term "preembryo" refers to the unborn's stage of development during the first 14 days after fertilization. After that, it is called an embryo until the end of the eighth week. From then on, it is called a fetus. Why is the word "preembryo" used?

According to the *International Journal of Sociology and Social Policy*, the term was "used as the rationale for permitting human embryo research" during the first 14 days after conception. One reference work says: "If one defines the embryo as the structure destined to become the baby, its earliest rudiments do not form until about two weeks after the sperm meets the egg." But can this preembryo be dismissed as a mere mass of cells, fit for little more than research? Consider what really happens during this two-week period.

After the sperm has penetrated the egg, it takes about 24 hours for the male and female chromosomes to fuse. During the next few days, the cell divides. Within four or five days after fertilization, the cluster of cells develops into a hollow sphere (still smaller than a pinhead) with an outer cell layer and an inner cell mass. It is now known as a blastocyst. Many of the cells of the outer layer will develop into non-embryonic tissues. From the inner cell mass, however, the baby itself will develop.

About a week after fertilization, implantation in the womb occurs. The blastocyst attaches itself to the womb and begins the construction of the placenta, which will allow the passage of oxygen and food from the mother's bloodstream and the release of wastes. According to the book *Incredible Voyage—Exploring the Human Body*, by about day nine the inner cell

mass starts "the task of constructing a new human being." It adds: "Those 20 or so cells must perform a series of restructurings and differentiations over another five or six days to create the first structural element of the actual embryo." So by the end of the second week, this "first structural element," from which the central nervous system eventually develops, begins to appear.

Because of this preparatory step-by-step process that goes on within the early human embryo, some argue that "there is no one biological event or moment that can be considered the start of a new human embryo."

True Christians, however, believe that life begins at conception. The fact that the original fertilized cell contains the program for the construction of the placenta, the implantation, the connections with the mother's blood vessels, and more only increases their admiration for the divine Designer, Jehovah God.

process of extracting embryonic stem cells essentially destroys the embryo.*

New genetic technologies raise yet other ethical issues. Consider, for example, preimplantation genetic diagnosis (PGD). (See the box "What About Preimplantation Genetic Diagnosis?") This technique involves

submitting embryos to genetic screening and then selecting the one—perhaps of the desired gender or free of a certain disease-causing gene—that is to be implanted into the uterus. Critics warn that PGD could lead to gender discrimination or that it might eventually be used to let couples choose other genetic traits for their children, including hair or eye color. PGD raises the ethical

* See the series "Stem Cells—Has Science Gone Too Far?" in the November 22, 2002, issue of *Awake!*

WHAT ABOUT PREIMPLANTATION GENETIC DIAGNOSIS?



A new development in test-tube fertilization is called preimplantation genetic diagnosis. This involves genetically screening embryos and then selecting the one that is to be implanted into the uterus. Commenting on the implications of this technique, the book *Choosing Assisted Reproduction—Social, Emotional and Ethical Considerations* explains:

“Soon [scientists] will be able to determine physical, intellectual, and perhaps

emotional and social characteristics in an embryo. Thus in the not too distant future it will be possible for parents to select some of their offspring's characteristics. And although many people would support the use of preimplantation genetic selection for couples who are carriers of a dreaded disease, many will not support this technology for couples who wish to have

a child of a particular sex—or in the future, for a child with blue eyes, or musical talent, or who will be tall.

“Preimplantation genetics, like many other technologies, raises the question of whether, because something can be done, it should be done. . . . The dilemma is where to draw the line—if anywhere—on this slippery high technological slope.”

WHAT DOES THE BIBLE SAY?

The Bible, of course, makes no direct comments on modern-day assisted reproductive procedures. It does, however, enable us to know God's view on certain key issues. And knowing the answers to two basic questions can guide true Christians in making decisions that are pleasing to God.

When does human life begin? The Bible indicates that life begins at conception. Note the words of the psalmist David, who was inspired to say of God: "Your eyes saw even the embryo of me, and in your book all its parts were down in writing." (Psalm 139:16) Con-

sider also Exodus 21:22, 23, where the original-language text indicates that a person would be held accountable for injury to an unborn child. The lesson to be learned is that our Creator views life as precious, even during the very early stages of development in the womb. In God's eyes the willful destruction of an embryo would be viewed as abortion.*

Are there any restrictions as to how one's reproductive powers may be used? God's view can be found at Leviticus 18:20, which says: "You must not give your emission as semen to the wife of your associate to become unclean by it." The underlying principle in that Scriptural decree is this: A man's semen should not be used to inseminate anyone other than his wife, and a woman should not bear a child for someone other than her own husband. In other words, the reproductive powers are not to be used for someone other than one's marriage mate. True Christians, therefore, avoid surrogate motherhood as well as any procedures that involve the use of donated sperm, eggs, or embryos.[#]

When making a decision involving assisted reproduction, true Christians must weigh carefully what the Bible reveals about God's thinking.[△] After all, he is the Originator of marriage and family life.—Ephesians 3:14, 15.

* See the article "The Bible's Viewpoint: When Does Human Life Begin?" in the October 8, 1990, issue of *Awake!*

[#] See the articles "The Bible's Viewpoint: Surrogate Motherhood—Is It for Christians?" in the March 8, 1993, issue of *Awake!* and "What Is the Bible's View?—Is Artificial Insemination Acceptable to God?" in the August 8, 1974, issue.

[△] For a discussion of in vitro fertilization where the sperm comes from the husband and the egg cell from his wife, see "Questions From Readers," in *The Watchtower* of June 1, 1981.



(Continued from page 8)

question, What happens to the embryos that are not selected?

Will the Marriage Bond Be Affected?

When considering certain forms of fertility treatment, there is another aspect to consider. How would the use of a surrogate mother or donated sperm or eggs affect the marriage bond? Some techniques may introduce a third party (a donor) or even a fourth party (two donors) or a fifth party (two donors and a surrogate mother) into the childbearing process.

Regarding treatment that involves donated genetic material, the parties involved need to consider other factors too.

- What long-term emotional effects may such a birth have on the parents when only one of them—or neither—is the genetic parent?
- How will the son or daughter handle learning that his or her birth resulted from such an unusual form of conception?
- Should the child be informed about his or her parentage and be allowed to look for the biological father or mother?
- What are the moral and legal rights and obligations of the one or more individuals who donated genetic material?

What About Anonymity?

The policy in many countries is to keep donors anonymous. The Human Fertilisation and Embryology Authority, which regulates the use of human reproductive material in Britain, explains: "Except where donation is intentionally between people known to each other, current and past donors will remain anonymous to the couples treated with their eggs or sperm, and to the children who may be born as a result of that treatment."

However, this policy of anonymity is the subject of heated debate in some places. A few countries have changed their policy or laws accordingly. Those who are against the policy of anonymity emphasize that children must have a full sense of their identity.

A report says: "Over 80 per cent of adopted people search for birth relatives, many of them to help satisfy the long-standing curiosity about origins which most people share. Almost 70 per cent want to identify important background information about possible hereditary medical conditions of birth parents."

Another report, based on interviews with 16 adults conceived by donor insemination, revealed that "many were shocked to discover their biological origins." The report added: "Many of the children faced problems with personal identity and feelings of abandonment. There were feelings of deceit and mistrust towards the families."

How Will You Decide?

Medical science will no doubt carry the development of assisted reproduction even further. Some predict that in the future 30 percent of all babies born will be the result of this technology. The debate over the ethical and moral issues involved will continue.

True Christians are guided by an even more important consideration—the viewpoint of our Creator, the one who arranged for procreation. (Psalm 36:9) Of course, the Bible does not directly comment on modern assisted reproductive techniques, for such procedures were not available in Bible times. However, the Bible does set out clear principles that indicate God's thinking and viewpoint. (See the box "What Does the Bible Say?") Such principles help us to make decisions that are ethical and moral and that leave us with a clear conscience before God.—1 Timothy 1:5.

In Our Next Issue

- Teen Pregnancy—A Global Tragedy
- How Should We Treat the Elderly?
- Glaucoma—The Thief of Sight



Toy-Free Kindergarten

BY AWAKE! WRITER IN GERMANY

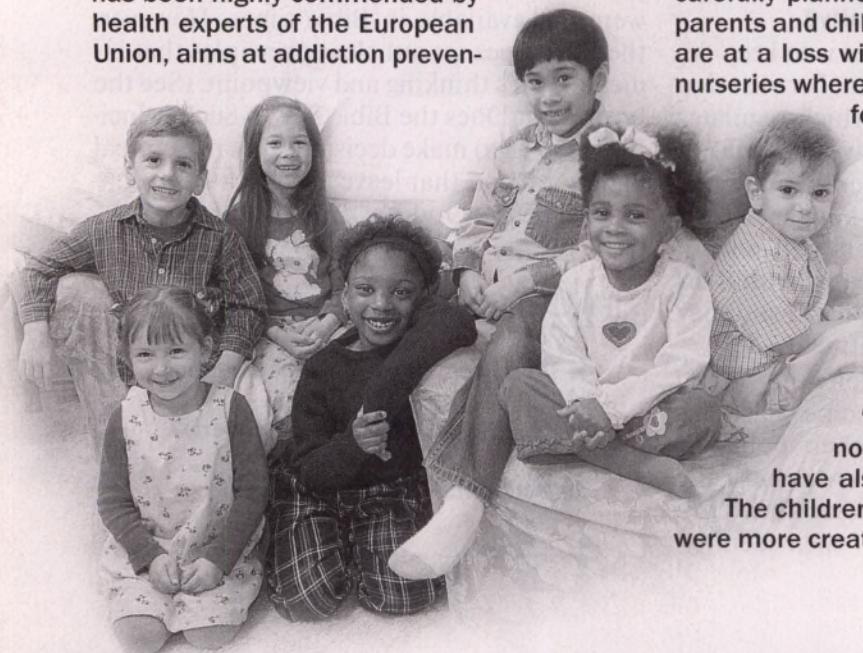
One morning when the children entered the kindergarten, they found that except for the furniture, all the rooms were empty. In vain, they searched for dolls, games, or stuffed animals. There were no books or building blocks either. Even paper and scissors were missing. All toys had been removed and would not be returned for three months. What had happened?

This kindergarten is one of a growing number in Austria, Germany, and Switzerland that are participating in a remarkable and innovative project called Toy-Free Kindergarten. Strange as it may sound, this project, which has been highly commended by health experts of the European Union, aims at addiction preven-

tion. In recent years researchers have come to appreciate that people are less susceptible to addiction of any kind if they develop social skills early in life. These include, says a newspaper report, "communication skills and the ability to make contact easily, to handle conflicts, to take responsibility for one's dealings, to set tasks for oneself, to see problems, to get help, and to find a solution." According to proponents of this program, such skills ought to be developed as early as possible, and toy-free periods serve this purpose, promoting creativity and self-confidence.

The three-month absence of toys has been carefully planned and discussed with both parents and children. Initially, some children are at a loss without toys. "There are day nurseries where children go wild for the first four weeks," and the planners are at their wit's end, the report notes. But children learn to adapt and learn to be creative. Having no toys to play with, children consult, plan, and play together more, thus improving social and language skills. Some who used to "hide" behind their toys are now making friends. Parents have also noted positive changes.

The children behaved better at play and were more creative than before, they said.



Young People Ask . . .

What's Wrong With Binge Drinking?

"Even though we had been drinking for several hours, my friend and I left the party at 1:00 a.m. with our own bottle of whiskey. We started walking home—drinking as we walked. The next thing I remember was the sun coming up, and I realized that we had been walking the wrong way. In fact, we had been walking along a major highway. It's a miracle that we didn't get hit."—Clay.*

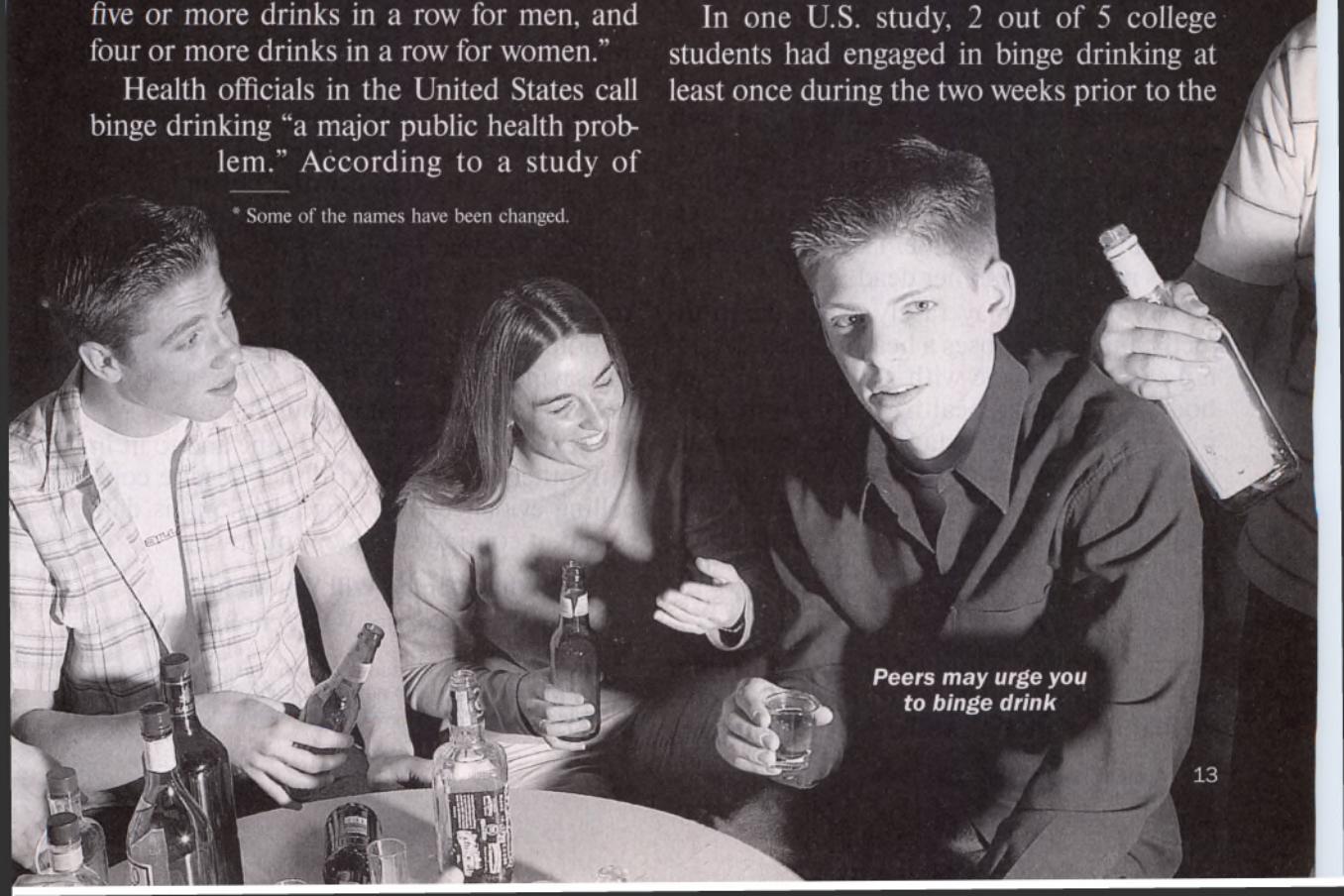
BINGE DRINKING. Some define it as simply drinking to get drunk. A report by the U.S. National Institute on Alcohol Abuse and Alcoholism tried to be more specific. It said that binge drinking is "typically defined as consuming five or more drinks in a row for men, and four or more drinks in a row for women."

Health officials in the United States call binge drinking "a major public health problem." According to a study of

secondary-school children in England, Scotland, and Wales, "up to a quarter of 13 and 14-year-olds claimed to have 'downed' at least five alcoholic drinks in a single session." About half of all 15- and 16-year-olds surveyed said they had done the same.

In one U.S. study, 2 out of 5 college students had engaged in binge drinking at least once during the two weeks prior to the

* Some of the names have been changed.



Peers may urge you
to binge drink

survey. According to the U.S. Department of Health, "about 10.4 million adolescents ages 12 to 20 reported using alcohol. Of those, 5.1 million were binge drinkers and included 2.3 million heavy drinkers who binged at least five times a month." A study done in Australia revealed that more girls than boys in that land binge drink—consuming between 13 and 30 drinks a session!

Much of this drinking takes place at the urging of other youths. Reports researcher Carol Falkowski: "New and daring drinking games flourish: group activities with the goal of drinking alcohol to intoxication. Some, for example, require all players to drink a shot of distilled spirits at a specified moment of a TV show or group conversation."

Binge Drinking—The Dangers

While heavy drinking may be considered a game to some, it is a very *dangerous* game! Excessive amounts of alcohol deprive the brain of oxygen; vital bodily functions can begin to shut down. Symptoms may include vomiting, unconsciousness, and slow or irregular breathing. In some cases death can result. About a month after graduating from high school, 17-year-old Kim went to an "all-you-can-drink" party. Kim consumed 17 drinks before passing out. Her older sister then came and took Kim home. The next morning, Kim's mother found her dead.

Overdrinking may rarely cause death directly, but it still poses a health threat. "Alcohol can raise havoc with any organ in your body," says mental-health expert Jerome Levin. "Alcohol's favorite targets are the nervous system, the liver, and the heart." Says an article in *Discover* magazine: "New research suggests that young drinkers are courting danger. Because their brains are still developing well into their twenties, teens who drink excessively may be destroying significant amounts of mental capacity." Chronic alcohol consumption is also associated with increased acne, premature wrinkling of the skin, weight gain,

damage to internal organs, alcohol dependency, and drug addiction.

There are other dangers associated with overdrinking. If you become drunk, you may be vulnerable to mistreatment. You can become the victim of physical assault or even rape. At the same time, you might well be a danger to others, engaging in out-of-control forms of behavior that you would not even consider if sober. The Bible thus warns that if you overdrink, "your own eyes will see strange things, and your own heart will speak perverse things." (Proverbs 23:33) Painful consequences can include ruined friendships, poor performance at school and work, a criminal record, and poverty.*—Proverbs 23:21.

The Pressure to Drink

Despite such dangers, alcohol is heavily promoted and readily available in many lands. In fact, drinking alcohol is glamorized in TV and magazine advertisements. More often, though, young people succumb to binge drinking as a result of peer pressure.

In an alcohol awareness survey taken in Australia, 36 percent of the young ones questioned said that they drank primarily "to fit in at social activities." In the chaotic atmosphere of a "beer bash," an otherwise shy person can become the life of the party as his peers urge him to down drink after drink. Young Katie was brought home in a coma after doing so. Her "friend" had given her alcohol, saying: "Come on, Katie, you're a big girl now. You should learn to chug it."

The desire to have a good time and to fit in with others is so powerful that despite compelling evidence that binge drinking is dangerous, it continues to be popular.

What Choice Will You Make?

The questions arise: What choices will you

* According to one U.S. study, "frequent binge drinkers were eight times more likely than non-binge drinkers to miss a class, fall behind in schoolwork, get hurt or injured, and damage property."

make when it comes to drinking? Will you simply follow your peers? Remember what the Bible says at Romans 6:16: "Do you not know that if you keep presenting yourselves to anyone as slaves to obey him, you are slaves of him because you obey him?" If you let your peers control your every move, you become nothing more than a slave to them. The Bible urges you to think for yourself. (Proverbs 1:4) It contains advice that can help you to avoid making serious mistakes. Consider what it has to say about alcohol.

Actually, the Bible does not condemn drinking alcohol, nor is it against young people having a good time. However, it does warn against *overdrinking*. "Wine is a ridiculer, intoxicating liquor is boisterous, and everyone going astray by it is not wise," says Proverbs 20:1. Yes, alcohol can make one act in a ridiculous and loud way! True, it may momentarily bring you pleasure, but if you overindulge, it "bites just like a serpent," leaving you with a host of physical and emotional injuries.—Proverbs 23:32.

Something else to consider is that in many countries there is a minimum age for drink-

ing alcohol. Christians obey such laws. (Titus 3:1) They are there to protect you.

Finally, and most important, consider the spiritual damage overdrinking can cause. Jehovah God wants you to serve him with "your whole mind"—not a mind needlessly damaged by overindulgence in alcohol! (Matthew 22:37) God's Word condemns not only "excesses with wine" but also "drinking matches." (1 Peter 4:3) Engaging in binge drinking is therefore counter to the will of our Creator. Such excess can prevent one from enjoying a close relationship with God.

What should you do if binge drinking has caught you in its snare? Get help immediately by speaking to a parent or a mature Christian.* Go to Jehovah God in prayer and beg for his help. After all, he is "a help that is readily to be found during distresses." (Psalm 46:1) Since binge drinking and underage drinking often result from peer pressure, you may need to make substantial changes in your choice of friends and entertainment. Making such changes will not be easy, but with Jehovah's help you can succeed.

* In some cases the assistance of a trained medical professional may be needed.

Binge Drinking—Tragic Statistics

The following statistics reveal the sad consequences of binge drinking among college students in the United States:

Death: Each year 1,400 college students between the ages of 18 and 24 die from alcohol-related unintentional injuries, including motor vehicle crashes

Injury: 500,000 students between the ages of 18 and 24 are unintentionally injured when under the influence of alcohol

Assault: More than 600,000 students between the ages of 18 and 24 are assaulted by another student who has been drinking

Sexual Abuse: More than 70,000 students between the ages of 18 and 24 are victims of alcohol-related sexual assault or date rape

Source: The U.S. National Institute on Alcohol Abuse and Alcoholism





Jewel scarab beetle,
Mexico



Jewel scarab beetle,
Honduras



Jewel scarab beetle,
Costa Rica

Living Jewels of the INSECT WORLD

BY AWAKE!
WRITER
IN SPAIN

THE high canopy of the tropical rain forest conceals thousands of living gems. Some glitter like gold and silver; others gleam like emeralds, rubies, and sapphires. These jewels of the forest, largely unseen by man, are beetles.

What comes to your mind when you think of beetles? Dark-colored bugs with grotesque features, scurrying around underfoot? In reality, beetles rank among the most colorful creatures on earth, as well as among the most numerous. According to *The Guinness Book of Animal Records*, the almost 400,000 identified species of Coleoptera—the scientific order that includes beetles—make

up almost one third of all the planet's known animal species. And in case you ever yearn to discover a new species yourself, you might try looking among the beetles. Entomologist Dr. Terry Erwin calculates that there could be millions more beetle species that remain unknown to science. Amazingly, Erwin found some 1,200 different species of beetles in just 19 large tropical trees.

Astonishing Variety

Considering the number of beetle species, it is not surprising that beetles come in a diversity of shapes and sizes. Some are "so big that early collectors knocked them out of the air by firing shotguns loaded with sand," says

Leaf Beetles

Some beetles, though beautiful, can be pests. Leaf beetles, for example, devour the leaves, stems, and roots of a wide variety of plants and crops.

Although there are about 25,000 species of leaf beetles, for many farmers the name may bring to mind only one—the Colorado potato beetle. Settlers in North America first recognized this beetle as a threat to their potato crops in 1859. By the early 20th century, the beetle

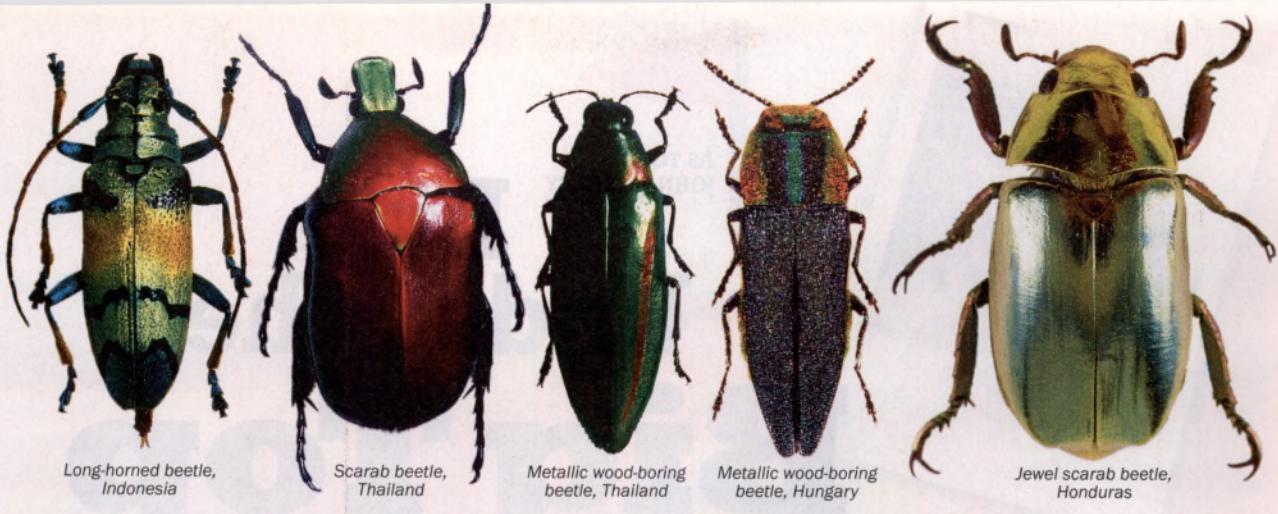
had invaded Europe, and now it has spread across that continent and into Asia.

Because of its ability to develop resistance to insecticides, the Colorado potato beetle has been a formidable foe. Today, a combination of agricultural, biological, and chemical tactics are employed to hold these voracious leaf-eaters at bay.



Colorado potato beetle, U.S.A.

Scott Bauer/Agricultural Research Service, USDA



Long-horned beetle,
Indonesia

Scarab beetle,
Thailand

Metallic wood-boring
beetle, Thailand

Metallic wood-boring
beetle, Hungary

Jewel scarab beetle,
Honduras

Top left to right: First three: Faunia, Madrid; fourth: Gyorgy Csoka, Hungary Forest Research Institute, www.insectimages.org; fifth: © Barbara Strnadova/Photo Researchers, Inc.

National Geographic magazine. Others are "so small they hitchhike on the mouthparts of bees. There are even beetles that make their way into museums and devour beetle collections," notes the magazine.

Beetle collections may, in fact, be worth a lot of money. Both the color and the rarity of the beetles affect their value. Scarab beetles run the gamut of greens and reds, along with silver and gold. A bright-red scarab, for instance, may sell for \$200, whereas a scarab with a fine golden sheen can fetch more than twice that amount.

Some long-horned beetles, so named for their outsize antennae, boast impressive and colorful patterns. Still other beetles glisten like tiny, iridescent mosaics. Their shimmering greens and blues rival the colors of hummingbirds. But it is not just their colors that

make beetles valuable. By recycling plant matter and dung, they also play a vital role in maintaining the health of ecosystems.

Insect Jewelry

Beetle collectors are not the only ones who prize these insect jewels. In the Americas, some women make necklaces by stringing together colorful beetle wing covers. In parts of Mexico, jewel beetles—aptly named—are outfitted with glued-on bits of colored glass and beads and turned into living brooches, tethered to their owner's clothing with a short chain.

Whether you prefer to admire beetles from afar or to examine them close up, these living jewels vividly demonstrate the fascinating beauty and complexity of earth's creatures.

Beetle Champions

■ Beetles hold the record for insect longevity.

Although most insects live for less than a year, some jewel beetles live to be more than 30 years old, and one is on record as having reached the ripe old age of 47. Jewel beetles "lay their eggs under the bark of a living tree" explains *The Guinness Book of Animal Records*. "If the tree is felled, it is not unusual for some of the larvae to survive and then be transported around the world in timber; since some species take many years to reach maturity, the adults may eventually emerge from furniture."

■ Goliath beetles of tropical Africa are the heavyweight champions of the insect world. Some males can weigh up to 3.5 ounces, three times the weight of a house mouse.

■ The award for the strongest weight lifter of the animal world (in proportion to size) goes to the rhinoceros beetle of the Dynastinae subfamily. This sturdy creature can support 850 times its own weight.



Goliath beetle,
Democratic
Republic of
Congo

Faunia, Madrid



Rhinoceros beetle,
Equatorial Guinea



AS TOLD BY
JOHN SMALLEY

Life Under the Big Top

"Ladies and gentlemen, children of all ages, welcome to the greatest show on earth!" To most people, those words of the circus ringmaster signal the start of an exciting show featuring animals, clowns, and acrobats. But to my family it meant the start of another work session under the big top of the Ringling Brothers and Barnum & Bailey Circus.

I WAS born in 1951. You could say that I was born with "sawdust in my shoes," a term that refers to the sawdust placed on the ground under the large tents of the circus. From the time my brother and I could walk, we shared in some facet of circus life.

My parents, Harry and Beatriz, joined the Clyde Beatty Circus before I was born. My mother was a singer and performed Spanish songs in full Mexican folk costume. As a musician, my father had played with the band-leader and composer John Philip Sousa during World War I. Then in the 1950's, my father was hired to play the tuba in the famous Ringling Brothers Band, perhaps because of his background with Sousa.

As time went on, we worked with various circuses, finally ending up in the Al G. Kelly & Miller Brothers Circus, which had also become very famous in the United States. This show had three big tents. One housed the menagerie of lions, tigers, elephants, hyenas, and other exotic animals.

We called the second tent the sideshow. In it there was usually a sword swallower, the so-called half-man half-woman, midgets, a giant, and other people with unusual physical traits. Living with people who were different was a good education for us children. Some called them unkind names, but to us they were family. We worked, ate, and lived with them for most of the year.

The third tent was the big top, which contained three rings where acts were performed simultaneously. Normally, the most dangerous or most intriguing acts occupied the center ring.

A Day in Circus Life

My brother and I were acrobats from a very early age. We were also part of the Wild West Show, where we played little Indian boys. A Native American family of the Choctaw tribe who were part of the show taught us to perform Indian dances.

Our day usually began about six in the morning. At that time we began preparations



Some of our circus "family," and my father with his tuba

to move to the next town. All of the performers shared in the work of dismantling, transporting, and reassembling the circus. For example, in addition to being a musician, my father also drove a big truck loaded with seven elephants. Sometimes my mother, my brother, and I rode with my father in his truck.

We usually traveled to a new location every day and put on two shows a day. The exception was Sunday, when we had only a matinee and could then rest with our families during the evening. My father always did something special with the family that day, whether a trip to town for a milk shake or an evening at a drive-in movie.

Setting up required much work. Even the elephants helped. How? They were harnessed to pull the long poles for the three tents. One end of the pole was inserted into a tent ring, and then an elephant would drag the other end until the pole was upright. When all the poles were up and the electrical generators were in place for the lights, we would ready ourselves for the afternoon show.

Learning New Tricks

Between the afternoon and evening shows was the time when the many children in the circus learned how to do somersaults, walk on a wire, juggle, swing from a trapeze. Those

who taught us were longtime circus patriarchs who usually came from generations of circus families. I remember the Italian performer who taught me my first somersault. I started when I was about four years old. First he secured me with a safety belt; then he used just his hands to support me as he ran alongside me. Eventually, he took his hands away, and I did it on my own.

The only accident I ever had took place during the grand parade around the hippodrome of the big top. My brother and I were placed behind a clown with two monkeys and in front of a herd of elephants. While walking and swinging my arms, I must have startled one of the monkeys, which then grabbed my hand and bit it severely. Fortunately, it did not get infected, but I still have a faint scar on my left hand—a serious reminder always to be cautious when dealing with wild animals, no matter how cute and tame they may seem.

I Learned Valuable Lessons

Circus life did not interfere with our family life. My parents always took the time to teach us good principles and morals. I can still remember my father putting me on his knee and giving me advice about not being biased against people of a different race or background. This was a valuable lesson, for I lived not only with people who were physically

different but also with people of various nationalities.

My mother too was a good influence on us. Sometimes the big top was filled to capacity; other times the crowds were sparse. My mother used to tell us: "You perform for the appreciation (as she clapped her hands together), not for the money. Whether hundreds of people attend or just a few, always do your best." That thought never left me. It was her way of saying that we should have personal interest in those who came, no matter how many or how few.

In addition to our performances, my brother and I had to help clean up after the shows, picking up trash from under the big top. This was good training for us.

From April to September, the circus was on the road, so we could not attend school as others did. We wintered at headquarters in Hugo, Oklahoma. During this time we attended school for about five months. Other circuses wintered in Hugo too, so there were many children in the same circumstances. The town's school system accommodated our special situation with an adjusted schedule.

The Day That Changed Our Lives

On the morning of September 16, 1960, my father woke up about five in the morning and began getting us ready to travel. That particular morning my mother decided that instead of riding in the elephant truck with my father, we would take the usual transportation provided by the circus.

As we arrived at the circus lot, my brother and I began exploring our new surroundings. Then we heard someone scream out: "There's been a bad accident. Smalley and the ringmaster didn't make it." Of course, my first reaction was, 'It just could not be true. There is some mistake.' Later I realized that our mother had already gone to the crash site. My father was driving down a mountain highway near Placerville, California, when apparently the brakes failed. Evidently, the weight of the

elephants caused the trailer rig to jackknife. The truck's large gasoline tank was compressed, and it then exploded, instantly killing my dad and the ringmaster, who was riding with him. I felt devastated that day. I was very close to my father. We were real friends.

After burying Dad in his hometown of Rich Hill, Missouri, we headed back to our winter headquarters in Hugo, Oklahoma, while our circus stayed on the road completing the season. In the meantime, we boys attended a school with a regular schedule. That was a new experience. Still, we eagerly awaited the next season to go out with the Kelly Miller Show again. But our lives took an interesting turn.

The Bible Comes Into Our Lives

When I arrived home from school one day, my mother introduced me to a lady who was there to study the Bible with us. Her name was Jimmie Brown, and she was one of Jehovah's Witnesses. Studying the Bible was the last thing I wanted to do. Going back to the circus and learning the trapeze had been my focus and dream for years. My brother and I even rigged up a makeshift trapeze between two trees so we could practice. However, we all started studying the Bible and attending meetings with an isolated group of only eight Witnesses in Hugo. In time, my mother decided to retire from circus life and pursue her Bible studies. With tears in my eyes, I accepted her decision. It was especially hard when members of our circus family came to visit and wondered why we were not joining them.

I had never known any life but the circus. At one point I felt as if we were turning our backs on our father's memory. Ironically, however, his death was also my reason for studying the Bible, since one of the strongest motivations for me was the hope of the resurrection. This hope is still very much alive in me. I want to be one of the first to welcome my father back as he enters the promised earthly Paradise.—Revelation 20:12-14.

One Witness couple, the Reeders, helped us to see that there is a big family in Jehovah's organization. And how true that proved to be! The small group of Jehovah's Witnesses became a congregation, with several families worshiping together. I must also mention Robert and Carol Engelhardt, a couple who adopted me as their spiritual son. They lovingly but firmly provided counsel and direction during my teenage years.

Such love from mature Christians filled a big void in our lives. And in a variety of ways, that has continued to be true throughout my life as a Christian. Over the years I lived in both Oklahoma and Texas, and in every congregation, I met many loving Christian brothers and sisters. Some of the older brothers provided me with fatherly direction and encouragement. Yes, they became my spiritual fathers.

Traveling Again

Just a few years ago, my mother fell asleep in death. Until that day, she remained a serious student of the Bible and a faithful Christian. I know that she will rejoice when God brings back his loyal ones from the tomb. While I await that day, I find comfort in the fact that Jehovah's organization has provided me with a family in more ways than one.

I felt especially blessed when, among God's people, I found my wife, Edna. After marriage we arranged our affairs so that we could share in Bible educational work on a full-time basis. To support us, I worked as an apprentice television reporter. I had no experience or training in that field; yet, the training I had received as a Bible teacher in the congregation of Jehovah's Witnesses qualified me for the job. Eventually I became the news director at a radio station. However, my goal was never to achieve prominence in the media. Rather, Edna and I made ourselves available to serve as teachers of Bible truths wherever there was a need.

In 1987, I was invited to become a circuit overseer, visiting congregations of Jehovah's

Witnesses. As a volunteer traveling elder, I visit a different congregation each week and provide my spiritual brothers and sisters with encouragement and training in our Bible educational work. Now, spiritually speaking, my family is even bigger. Even though my wife and I have never had children of our own, we have come to have many spiritual sons and daughters in Jehovah's organization.

In a way, it is ironic that after so many years, I am still traveling from town to town. From circus work to circuit work! Once in a while, I wonder whether I could have made it on the trapeze. Would I have realized my childhood dream of mastering the triple somersault? Those thoughts, however, quickly fade when I think about God's promise of a paradise here on earth.—Revelation 21:4.

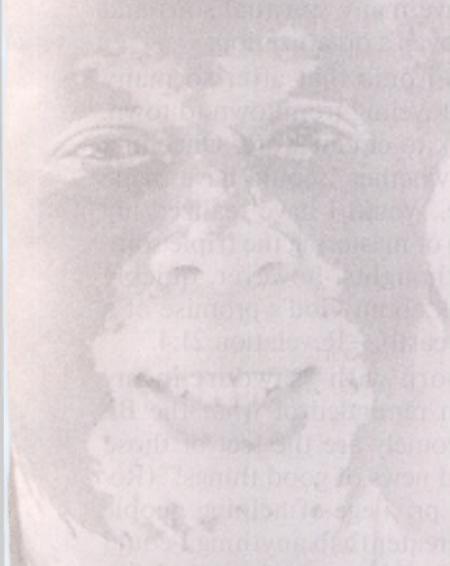
True, I was born with "sawdust in my shoes." But I am reminded of what the Bible says: "How comely are the feet of those who declare good news of good things!" (Romans 10:15) The privilege of helping people to know God is greater than anything I could have achieved as a circus performer. Jehovah's blessing has made my life full!



With my wife, Edna, today

What Is Vitiligo?

By Awake! writer in South Africa



*In 1967,
before the
affliction*



Sometimes Sibongile speaks humorously of her skin condition. She says with a smile, "I was born black, became white, and now I'm just confused." She has vitiligo.

Vitiligo, also called leukoderma, is triggered by the loss of pigment-producing cells in the skin. This results in the formation of white spots and patches on the skin. With some patients the condition never progresses beyond the appearance of one patch. With others, however, it spreads over the body quickly. Still others may suffer a slower form of vitiligo that continues to spread over many years. Vitiligo is neither physically painful nor contagious.

Not all cases of vitiligo may be as obvious as Sibongile's because it is most noticeable on dark-skinned people. But there are many people afflicted to one degree or another. Statistics show that between 1 and 2 percent of the population is affected. Vitiligo knows no racial boundaries and affects men and women equally. Its cause is still unknown.

While there is no sure cure for vitiligo, there are many ways of dealing with it. For instance, in light-skinned patients, the condition is more evident when the unaffected skin is sun-tanned. Hence, avoiding exposure to the sun can make the condition less noticeable. With darker-skinned people, special cosmetics can help disguise the contrasts in skin color. Some patients have responded well to a process known as repigmentation. This treatment involves many months of medication and the use of special ultraviolet equipment. In some cases this treatment has caused normal color to return to parts of the afflicted skin. Other patients choose depigmentation. The goal of this treatment is to even out the skin tone by destroying the remaining pigment-producing cells with the use of medication.

Vitiligo can cause emotional distress to those afflicted, especially when it spreads to the face. "Recently," explains Sibongile, "two children looked at me and ran away screaming. Others are hesitant to speak with me, thinking that I may have a contagious disease or that I have been cursed. If I could get one point across to others, it would be that they do not have to be afraid of people with this condition. They cannot catch vitiligo by touch or through the air."

Sibongile does not allow her condition to deter her from the Bible teaching work she loves so much as one of Jehovah's Witnesses. This entails visiting people in their homes and speaking with them face-to-face. She says: "I have come to accept my appearance. I feel more comfortable being just as I am, and I look forward to the time when my birth color will be completely restored to me in the earthly Paradise promised by Jehovah God."—Revelation 21:3-5.

Mountains Made of Marble

By *Awake!*
writer
in Italy

THE peaks that dominate Carrara and Pietrasanta seem to be flecked with snow. But this is an illusion. Those white patches are really vast areas of debris produced by quarrying. These mountains in the Apuan Alps of Tuscany, located in north-central Italy, are a geologic rarity. Here the mountains are made of marble. Nowhere else in the world can such a concentration of this noble material be found.

From antiquity man has extracted stone from these mountains and transformed it into columns, panels, floors, and stunning sculptures. Substantial marble deposits, the experience and professionalism of local workers, and the quality of technology used here have won this district the role of world stone marketplace. In addition to locally quarried materials, stone shipped to the port of Marina di Carrara from every corner of the globe is also processed by the area's specialized industries and is then exported worldwide.

An Ancient Marble Tradition

The ancient Romans exploited local stones for construction and sculpture. Carrara's white statuary marble is held to be especially beautiful. In 1505, Michelangelo came here to choose blocks of fine-grained marble without any veining or defects, which he used when sculpturing some of his most celebrated masterpieces.

Ancient methods of quarrying remained basically unchanged for centuries. Wooden wedges were strategically inserted into natural cracks

or recesses carved into the rock. When water was poured over the wedges, they swelled, finally detaching a block. Explosives were introduced in the mid-18th century, but these shattered so much of the rock that, at most, only a third could be used. Huge chunks of leftover marble—those patches that appear to be snow—bear testimony to the methods of bygone days.

Moving monoliths down steep inclined planes with sleds and ropes was perilous business. "If the cable holding the sled broke," explains one source, "it meant certain death for the gang leader, who stood in front of the block to direct operations; and there was little chance of escape for any in his gang struck by the cable as if by a terrible whiplash."

Modern methods, of course, are very different. I spent a day in the Carrara area and was given some insight into how marble is currently worked. Let me share with you what I learned.

A Visit to the Quarry

I find Giovanni, who is to be my guide to the quarry, in one of the many marble yards of Carrara. Such yards stock hundreds of marble blocks, stacked neatly one on top of the other, ready to be sold or worked on site. Automatic machines saw slabs out of blocks, and others do the polishing. Both jobs once had to be done by hand.

For our visit to the quarry, we take Giovanni's four-wheel-drive vehicle and are soon negotiating steep hairpin turns that lead

Underground quarry



us into a narrow mountain valley where fragments of white rock lie all around. The trucks we see laboring downhill bearing enormous blocks of stone can carry loads of up to 30 tons.

Rounding a bend, we sight a dazzling white wall carved into the mountain. It is huge and is made up of a series of giant steps, or benches, each some 20 to 30 feet high. Giovanni drives onto one and stops.

A glance around reveals that we are in one of the many quarries in the valley. More white scars, some of them hundreds of feet above us, stand out on the natural rock surface. This has rightly been called a 'grand yet terrible' spectacle.

My musing is interrupted by a bulldozer working with a pointed tool to turn over a section of our bench. The block, perfectly squared and measuring perhaps 40 by 7 feet and 20 feet in height, crashes onto a bed of rubble prepared to cushion its fall. But how is the rock removed in blocks like that?

The answer comes from Franco, Giovanni's father, who has worked in the quarries all his life. He shows me a pulley driving a long steel cable that is making a vertical cut into the back wall of the bench we are on. A three-inch hole is drilled horizontally into the rock face, he explains, then another vertically into the bench above. The two holes have to intersect. A diamond-studded steel cable is then threaded through the holes and made into a loop, like a giant necklace. Tensed and driven at high speed by an electric mo-

tor, the cable makes the cut desired. When all the block's faces—horizontal and vertical—have been freed, the block is turned over. Then, using the same cable, it is cut into pieces of a more manageable size for transportation. Similar methods are used in underground quarries nearby, where marble is cut from chambers in the very heart of these mountains.

Local factories transform this raw material into a whole range of products—tiles, structural elements, facing for use in architecture. Construction is, and has always been, the main outlet for Carrara's stone products.

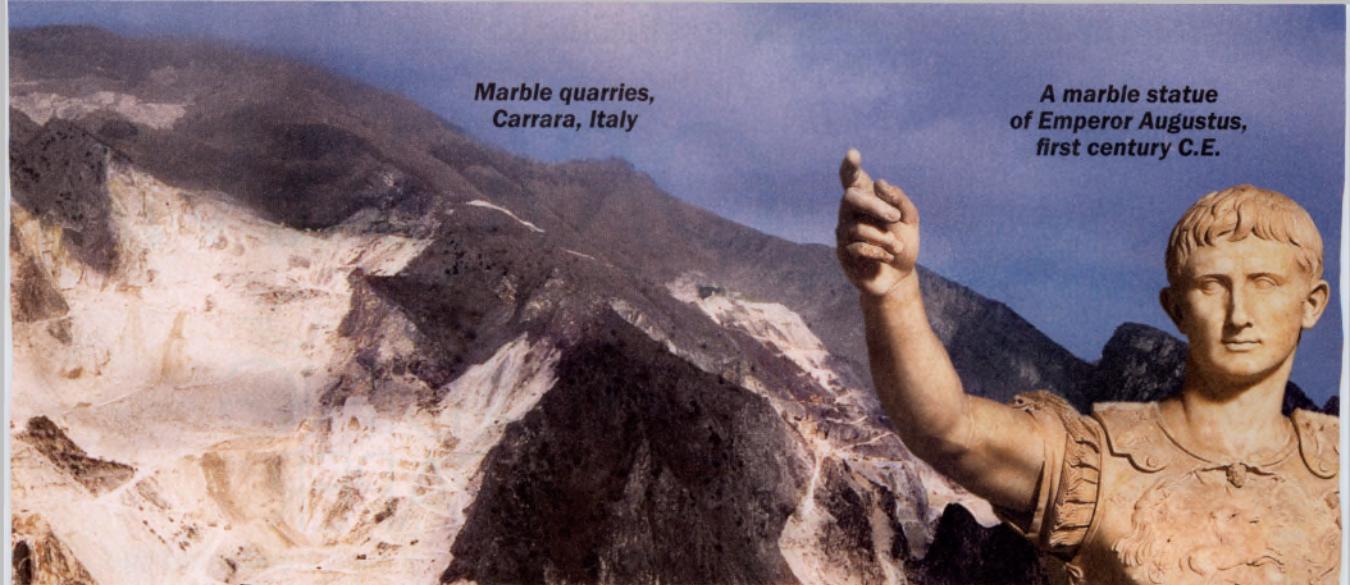
Some workshops produce floors and interior or exterior furnishings designed to order. Others specialize in or-

Diamond-studded cable is used to cut blocks of marble



*Marble quarries,
Carrara, Italy*

*A marble statue
of Emperor Augustus,
first century C.E.*



nate mantelpieces, bathroom fittings, tables, and the like. Local products in any of the beautifully patterned and colored stones available on the market are destined to adorn public squares as well as public and private buildings, including places of worship, museums, shopping malls, airports, and skyscrapers worldwide.

The industrial side of marble is interesting, but I am also interested in decorative and artistic applications. To learn more about these, I spend the afternoon at Pietrasanta.

The Marble Workshops

"Drop by at the craftsmen's workshops," invites a Pietrasanta tourist information booklet, and they "will be glad to show you their skill." Pietrasanta is a friendly little place, and it is no problem for me simply to wander into several of the workshops in and around the medieval center to admire the works being produced there.

Here I meet sculptors from many lands who are busy on bold original works, while local artisans, their hands and faces covered with white dust, are intent on reproducing stat-

ues from plaster models. Crammed with classical and modern treasures, studio showrooms look like overcrowded museums.

Sculpturing a statue is a long process. A two-ton block, for instance, might be roughly shaped using a machine saw; then, from three to five months may be spent carefully chipping away at the block before the job is done. A ton of marble may be removed in the process. Basic tools once included hammers, chisels, and files. Now, angle grinders and pneumatic chisels—the "little brothers" of pavement-breaking jackhammers—speed up operations, but details have to be finished by hand. The results can be breathtakingly beautiful.

The ancient art of marble carving does not survive in many places. Yet, thanks to its resources, to the ability acquired by master craftsmen through centuries of experience, and to artists who come here to tap local knowledge, the area of Carrara and Pietrasanta can rightly be called "a great marble academy."

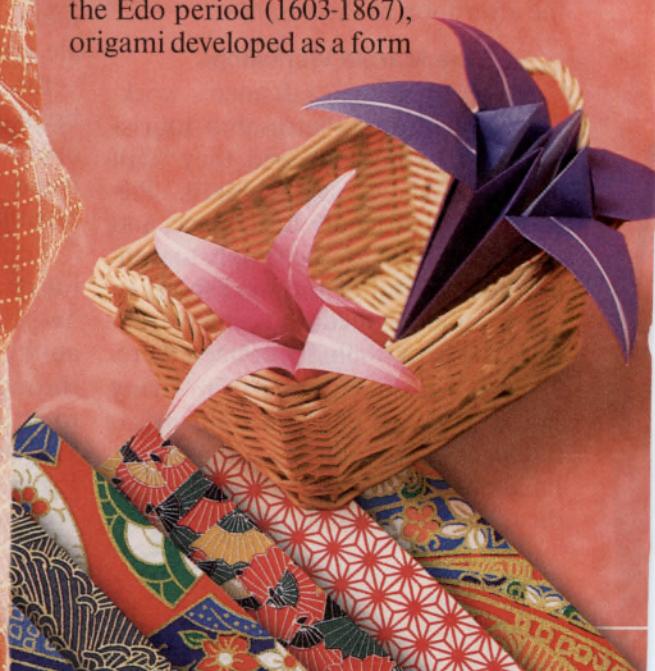
ORIGAMI

THE ART OF FOLDING PAPER

BY AWAKE! WRITER
IN JAPAN

IMAGINE a single piece of paper transformed into a beautiful, three-dimensional crane. Its wings are proudly extended, and rising from the bird's graceful body is a long slender neck, crowned by an elegant head and a distinctive beak. Amazingly, this crane is created by folding a square piece of paper in a precise 12-step process.

The making of a stunning array of shapes by folding, opening, and bending a flat piece of paper is a Japanese art form called origami. The term itself means "folded paper." Although its origins are not clearly known, origami in Japan can be traced back to ancient times when formal documents were elaborately folded. It is thought that during the Edo period (1603-1867), origami developed as a form





of leisure activity that anyone could enjoy. It was then that new techniques of folding were developed. This art has been handed down from one generation to another as parents have taught their children and grandchildren. Many Japanese fondly recall that as children they would stare in astonishment while their mother nimbly folded paper, creating delightful objects for them.

Based on the shapes created, there are basically two classifications of origami. One is called *traditional origami*, which involves forming paper cranes, frogs, boats, balloons, insects, and plants. The other is called *creative origami*, which departs from the traditional techniques that have been used for centuries. Large dinosaurs, elaborate insects, and other intricate designs are created in this type of origami.

In modern times a number of professional fields, such as architecture, have applied the principles of origami in the design of a wide variety of functional products. Origami has also been used by health providers as an effective rehabilitation exercise for the elderly and the handicapped.

Making Your Own Origami

How can you make origami? Traditional origami is not difficult. It requires no special tools or training—just care and your powers of observation. Of course, you need appropriate paper and the rules for folding. Anyone who patiently and faithfully folds the paper can transform it into an attractive shape.

You may use any paper on hand, including newspaper, advertisement fliers, or decorative wrapping paper. You can decide the size, quality, and color of your paper according to what you wish to make. If you want to make something really pretty, however, you should consider the

color of the paper carefully. The attractiveness of your creation will depend not only on the way you fold the paper but also on the kind of paper you use. It would be good to use paper made specifically for origami. You may even want to use *washi*, Japanese handmade paper.*

For most shapes it is essential that the paper be a perfect square. You can check if the paper is square by bringing the opposite corners together and folding the paper into a triangle. If all the edges match perfectly, then the paper has been cut correctly.

To produce a beautiful end result, you have to fold the paper so that corner matches corner and edge matches edge precisely. Also, the folds must be tight. When folding the paper in half to form a triangle, hold the two diagonal corners together firmly and exactly between your thumb and first finger, and then fold the base with your other hand. When folding the paper in half to form a rectangle, make sure that both top corners match perfectly, and then hold the top edges together firmly while you fold the base.

Some origami shapes require that the paper be folded and then unfolded, producing a crease in preparation for the next step. The paper is at times curled, pleated, rolled over, pinched, pushed in, blown open, turned over—all in order to shape it for different effects.

Origami can be enjoyed anywhere, anytime. After learning this art, basically all you need is paper. By just using your fingers, you can make a variety of traditional shapes or even create new ones of your own. Expect some level of frustration if you try to learn origami from a chart of drawings. But if you happen to meet someone who knows origami, take advantage of the opportunity to learn this art of folding paper.



* See the article "Washi—Japan's Ancient Handmade Paper," published in the January 8, 1992, issue of *Awake!*

Watching the World

Animal Antibiotics

For a long time, the World Health Organization (WHO) has warned about the excessive and unnecessary use of antibiotics for farm animals that are not sick. According to the Spanish newspaper *ABC*, the drugs have been routinely added to animal feed "in order to fatten the farm animals quickly." Recently, a Danish study has shown that raising animals can be profitable without the help of antibiotics. When the farmers eliminated antibiotics from animal feed, chicken production was unaffected and the cost of pork production increased by only 1 percent. WHO has applauded the Danish initiative and is encouraging other countries to take similar measures. Doing so, says the paper, "would be beneficial for public health as well."

Cheating Chess Players

"Many chess players don't always take the rules too seriously," reports the *Frankfurter Allgemeine Zeitung*. One example is an amateur player who won against a grand master. Later, however, it was discovered that hidden under his long hair were a microphone, earphones, and a camera, for communicating with a chess player at a computer in another room. Oth-

Garbage Diet

"It is amazing how important garbage has become as a food source for numerous birds and mammals," says biologist Wilfried Meyer.

"In some places garbage ensures the very survival of some species." As reported in the newsmagazine *Der Spiegel*, a global study project found that nearly 70 species



of birds and 50 species of mammals feed on refuse. A real food chain has developed at landfills. Insects thrive in the warmth produced by the rotting garbage. Birds and small mammals feed on these insects and are themselves hunted by birds of prey and other predators. Interestingly, some birds that are shy by nature do not mind the deafening noise of the compactors and the presence of other animals and humans at garbage dumps.



ers have been known to go to the toilet, close the door, and pull out a hand-held computer to calculate their next moves. On-line players can also be devious. Some run a chess program on their computer while participating in an on-line game. In other cases players participated under two names and played against themselves—one name always losing and thereby pushing the other up in the ranking list. "For many it is not so much a question of prize money," states the newspaper. "In almost every case, the motivating factor is, not greed, but vanity."

Too Old to Learn?

"When the six-year-olds take a lesson at [an elementary school in Kenya's Rift Valley Province], one pupil stands out head and shoulders above the rest," reports the *Daily Nation* newspaper of Nairobi. It is an 84-year-old man who recently joined the first graders so that "he can learn to read the Bible." Although he has grandchildren who are several grades ahead of him, he still attends his classes. "People have been telling me things in the Bible, which I do not know if they are true, and I want to

read the Holy Book for myself and find out," the man told the *Nation*. Complete with a school uniform and other study items, he tries his best to conform to the rigorous school rules. Some things, though, he is allowed to do differently. When other students are exercising and running around, he "is allowed to gently stretch his muscles."

Deadly Earthquakes in 2003

"According to the U.S. Geological Survey (USGS), 2003 closed as the deadliest year for earthquakes since 1990, 25 times more fatal than 2002," says a press re-

lease from the agency. "In 2002, 1711 people died in quakes around the world," while 43,819 perished last year. About 41,000 of those deaths occurred in Iran when a magnitude 6.6 earthquake hit the city of Bam on December 26. The most severe quake, and the only one to qualify as a "great" quake, was the one that struck Hokkaido, Japan, on September 25. It had a magnitude of 8.3. According to the report, "the USGS locates about 50 earthquakes each day.... On average, there are 18 major earthquakes (magnitude 7.0 to 7.9) and one great earthquake (8.0 or higher) each year worldwide. Sev-

eral million earthquakes occur in the world each year, but many go undetected because they occur in remote areas or have very small magnitudes."

Why So Much Juvenile Crime?

Specialists believe that dysfunctional family life is at the root of a rapid rise in the number of child criminals. As pointed out in a report in the South African newspaper *Weekend Witness*, most of these children are from broken homes or homes where both parents work and are "too busy, tired or rushed" to care for them. According to criminologist Dr. Irma Labuschagne, many teenagers do not even understand the concept of "family" and "are yearning for love and acceptance." They thus seek these elsewhere and become easy prey for criminal gangs that offer them a sense of belonging. Parents, observed psychologist Dr. Cecelia Jansen, "are so caught up in their own search for status, success and materialism that they don't know what is happening in the lives of their family members." Both Labuschagne and Jansen recommend "a return to old-fashioned family values," says the paper. It concludes: "There is no replacement for a healthy, happy, normal family."

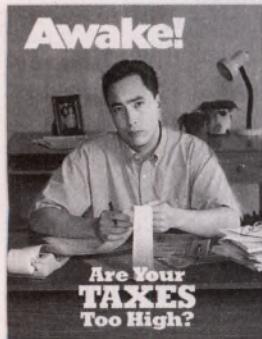


Jumbo Hijackers
It appears that humans are not the only highway robbers. According to the *Bangkok Post*, elephants have also joined the ranks. Hungry elephants from the jungles east of Bangkok have been blocking the roads used by sugarcane trucks and hijacking their sweet cargo. About 130 elephants normally live in the Ang Lue Nai wildlife sanctuary, but dry weather has reduced the vegetation available for them, forcing the hungry elephants to wander out of the jungle in search of food. The sanctuary's chief overseer, Yoo Senatham, reported that some elephants have also resorted to raiding plantations, while others pick up sugarcane dropped off for them by sympathetic truck drivers.

From Our Readers

Taxes I have been doing research for the past few weeks on the subject of taxes. Questions arose such as, When did taxation first come about? I was in the midst of this research when my wife received a copy of the December 8, 2003, issue of *Awake!* featuring the series, "Are Your Taxes Too High?" To my surprise, it discussed some of the very issues I was researching.

S. Y., Tajikistan



Accepted God's View of Blood." (December 8, 2003) His experience was very similar to mine in that I also had to learn to put medicine in second place in my life. Perhaps I will meet Brother Aizawa in God's new world, where we will both be unemployed as doctors. There will be no need for doctors then!

A. S., Ecuador

In October of 2002, our youngest daughter was diagnosed with cancer. The treatment was difficult, involving two operations, chemotherapy, and radiation therapy. During that time, we made every effort to adhere to the Bible's command to abstain from blood. This was not easy, for in Lithuania blood is administered to almost all children receiving chemotherapy. The article "I Accepted God's View of Blood" strengthened us to uphold Jehovah's view. And now our daughter's cancer is in remission.

M. and S. D., Lithuania

Sibling Rivalry I want to convey my deep thanks for the article "Young People Ask . . . How Can I Come Out From Under My Sibling's Shadow?" (November 22, 2003) I am 16 years old, and it seems to me that my older sister always gets the attention. Of course, I know in my head that Jehovah notices me, but somehow I still feel lonely. This article dealt with my feelings. And because it was so gently word-

ed, tears came to my eyes as I read it. Thank you for the practical advice. It softened my heart.

M. O., Japan

On occasion I have felt the way all the young ones quoted in the article did. As long as I can remember, my older sister has always been viewed as a good example. So I know how it is to feel that you are always measured against another family member. What you said about finding something that you can do well yourself was like "apples of gold in silver carvings"—words that came at the right time.—Proverbs 25:11.

S. T., United States

I have an older sister and a younger brother. They are both better at most things than I am. So I took your advice, and I'm now learning Spanish and going out in the ministry more often. I'm having fun learning—and people are noticing me too.

H. B., United States

Fate of the Universe? In the article "Science Was My Religion" (September 22, 2003), Kenneth Tanaka seems unaware of the belief among scientists that the universe will continue expanding forever.

R. G., United States

"Awake!" responds: Cosmologists are not unanimous in their views. Some, for example, continue to suggest that the process of expansion will eventually slow, stop, and reverse until the universe collapses on itself. Kenneth Tanaka's statement drew attention to both hypotheses without endorsing either. The purpose of his statement was to highlight his search for meaning in the face of the inability of science to provide all the answers.

A Living Light Show Beneath the Waves

Finning his way along the base of a rocky ledge, a scuba diver saw a two-foot-long cuttlefish hovering in a recess, almost perfectly camouflaged in its blue-gray surroundings. When the diver got closer, the cuttlefish flushed a brilliant, shimmering crimson. When he backed off, it returned to its original color. Have you ever wondered how these amazing mollusks accomplish that feat—an ability they share with certain species of octopus and squid?

Their secret lies in chromatophores, pigment-bearing cells in the skin. Nerves cause muscular contractions that regulate the size of these cells, thus causing the creature to vary its color and create changing patterns of color.

In addition to controlling color, many species of squid even produce their own light, doing so in a way similar to that of the common firefly. This bioluminescence, which is seen in many other marine creatures—from

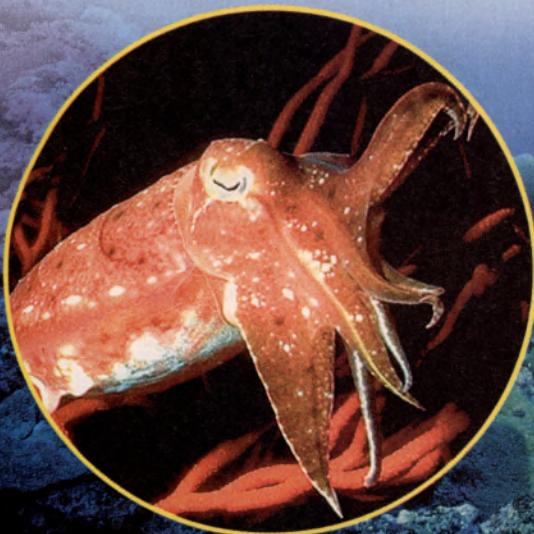
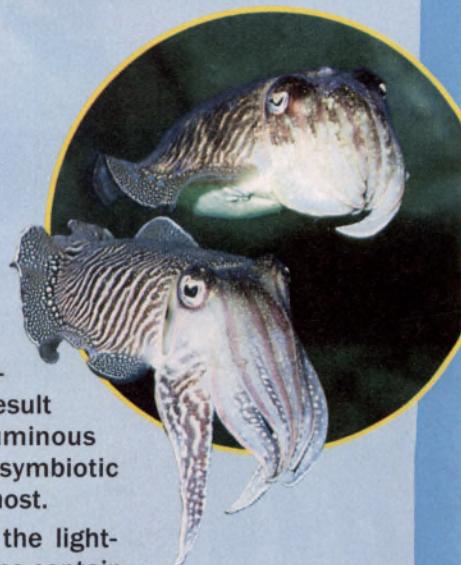
jellyfish to shrimp—results from complex chemical reactions in cells called photocytes or in organs called photophores. It can also result from the activity of luminous bacteria that enjoy a symbiotic relationship with their host.

In the former case, the light-emitting cells and organs contain a chemical called luciferin, which reacts with oxygen in the presence of an enzyme, creating light that is usually blue to green in color. Some luminous organs, says the journal *Scientific American*, “are elaborate devices with lenses for focusing, a color filter, or an adjustable flap that serves as an off/on switch. Squid that have both photophores and chromatophores within their skin can control both the color and the intensity of light produced.”

Creatures that glow by employing luminous bacteria accommodate their microscopic guests in special light organs, which are endowed with a rich supply of blood. The blood carries nutrition to the microbes, in effect paying the “light bill.”

▲ David Nicholson / Lepus/Photo Researchers, Inc.

Inset: Courtesy Jeffrey Jeffords/www.divegallery.com



MAPS

AN AID IN BIBLE READING

When you read in the Bible about people and the places to which they traveled, do you ever try to visualize the route they took or the land they visited? Now with the help of the recently published Bible atlas "See the Good Land," you can add to your knowledge of Bible geography.

A woman in Ireland who received a copy of the brochure "See the Good Land" explains: "Every morning as I do my Bible reading, my brochure gets a workout. How thrilling to trace the footsteps of the people—the prophets, the kings—imagining the difficulties in travel, the distances, and the locations where they lived. I add my own little notes to the maps as I go along. I'm still in the Hebrew Scriptures but look forward with great anticipation to the Greek Scriptures."

Torrent valley and brochure cover: Pictorial Archive (Near Eastern History) Est.; background map: Based on maps copyrighted by Pictorial Archive (Near Eastern History) Est. and Survey of Israel.

