

Awake!

May 8, 1999



**YOUR BRAIN
HOW DOES IT WORK?**

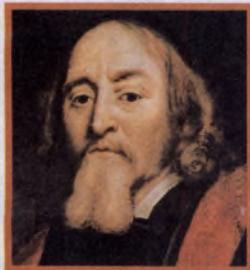
Your Brain —How Does It Work? 3-11

"The ultimate riddle."

"One of the most
astonishing objects
in the universe."

Why is the brain
so described? How
does it function?

Aztec calendar on pages 2, 15-
16, and 20: CNCA.-INAH.-MEX
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Nahuatl-speaking Mexicans are descendants of Aztec survivors of a bloody struggle with the Spanish conquistadores. What do we know about the ancient Aztecs?

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YOUR BRAIN

A MARVEL OF INTRICACY

"The human brain presents the ultimate riddle: how can a mass of tissue with the consistency of raw egg be responsible for your 'mind,' your thoughts, your personality, your memories and feelings, and even your actual consciousness?"—Professor Susan A. Greenfield, *The Human Mind Explained*.

YOUR brain regulates how your body operates. It enables you to learn new concepts, even new languages, and it stores and recalls the memories of your lifetime. Yet, neurobiologist James Bower admits: "We really don't know what kind of machine the brain is." Neuroscientist Richard F. Thompson agrees: "There is far more to be learned than we know now." So great is the interest in unraveling the brain's mysteries that the U.S. Congress declared the '90's to be the Decade of the Brain.

A Glimpse Inside Your Head

The gnarled lobes of the cerebral cortex, or the brain's outer layer, present the most striking feature. (See the diagram on page 4 and the box on page 8.) This convoluted layer of pinkish-gray matter, which is about one eighth inch thick, houses some 75 percent of the brain's 10 billion to 100 billion neurons (nerve cells). But some scientists say that even this vast quantity cannot account for the brain's complexity.

Many neurons have a long taillike structure called an axon. The other fibers that spread out from the neuron are tiny dendrites, which resemble branches and twigs on a budding tree. These provide a typical neuron with thousands of links to other neurons. The neurons never actually touch each other. Across the intervening gap, called the synapse, tiny amounts of chem-

icals flow, adding a new dimension to the complexity of the whole structure.

"The number of possible different combinations of synaptic connections" in your brain is "larger than the total number of atomic particles that make up the known universe," estimates one expert.

Although the neuron-filled cortex is perhaps the best-known part of the brain, what about the regions that lie beneath the cortex? For example, your corpus callosum provides the vital link between the left and right cerebral hemispheres. Nearby are your thalamus (from the Greek for inner chamber), through which passes most of the information your brain receives; the associated hypothalamus (Greek for below inner chamber), which helps regulate your blood pressure and body temperature; and a small extension called the pituitary gland. This master gland controls your endocrine system by secreting chemicals called hormones, which influence what is produced by all the other glands of the body. Then you have the pons, which processes information about the movements you make, and the medulla, which controls your breathing, circulation, heartbeat, and digestion. They do all of this without your even realizing that they are there!

With such diversity of parts, how does the brain work? And how can you make the best use of your brain? The following two articles offer some possible answers.

SOME COMPONENTS OF THE BRAIN

Cerebral cortex

The relatively thin outer layer of each cerebral hemisphere

Illustrated at actual size

Based on *The Human Mind Explained*, by Professor Susan A. Greenfield, 1996

Cerebrum

The large rounded structure of the brain. It occupies most of the cranium

INNER CORE

Visual cortex

Thalamus

Controls certain autonomic bodily functions

Corpus callosum

A bundle of nerve fibers linking the cerebral hemispheres

Pituitary gland

Cerebellum

Literally "little brain." A structure found at the rear base of the whole brain

Pons

Medulla

Why We Don't Need a Bigger Head

"If the human brain's cerebral cortex was smooth rather than wrinkled, the brain would have to be about the same size as a basketball, instead of about the size of two clenched fists held side by side."—Professor Susan A. Greenfield

Why Awake! Is Published *Awake!* is for the enlightenment of the entire family. It shows how to cope with today's problems. It reports the news, tells about people in many lands, examines religion and science. But it does more. It probes beneath the surface and points to the real meaning behind current events, yet it always stays politically neutral and does not exalt one race above another. Most important, this magazine builds confidence in the Creator's promise of a peaceful and secure new world that is about to replace the present wicked, lawless system of things.

Would you welcome more information? Write Watch Tower at the appropriate address on page 5. Publication of *Awake!* is part of a worldwide Bible educational work supported by voluntary donations.

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YOUR BRAIN

HOW DOES IT WORK?

"The brain is the most difficult part of the body to study," observes E. Fuller Torrey, a psychiatrist at the U.S. National Institute of Mental Health. "We carry it around in this box on our shoulders that's very inconvenient for research."

NEVERTHELESS, scientists say that they have already learned much about the way the brain processes the information that our five senses supply. Consider, for example, the way it deals with visual sensations.

Your Mind's Eyes

Light reaches your eye and strikes the retina, consisting of three layers of cells at the back of your eyeball. Light penetrates to the third layer. This layer contains cells known as rods, which are sensitive to brightness, and cones, which are responsive to light of different wavelengths corresponding to the colors red, green, and blue. The light bleaches pigment in these cells. This sends a signal to cells in the second layer and from there to other cells in the top layer. Axons of these cells combine to form the optic nerve.

The millions of neurons of the optic nerve arrive at a junction in the brain known as the optic chiasma. Here neurons carrying signals from the left-hand part of each eye's

retina now meet and follow parallel tracks to the left-hand side of the brain. Similarly, signals from the right-hand side of each retina join forces and travel to the right-hand side. The impulses arrive next at a relay station in the thalamus, and from there the next neurons pass the signals to the area at the back of the brain known as the visual cortex.

Different aspects of visual information travel along parallel paths. Researchers now know that the primary visual cortex together with a nearby region acts like a post office in sorting, routing, and integrating the variety of information that the neurons bring. A third region detects shape, such as the edge of an object, and motion. A fourth area recognizes both form and color, whereas a fifth one constantly updates maps of the visual data to track movement. Current research indicates that as many as 30 different brain areas process the visual information the eye collects! But how do they combine to present you with an image? Yes, how does your mind "see"?

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"Seeing" With One's Brain

The eye gathers information for the brain, but it is the cortex that evidently processes the information that the brain receives. Take a picture with a camera, and the resulting photo reveals details of the whole scene. But when your eyes observe the same view, you consciously observe only that part of the scene on which you focus your attention. How the brain does this remains a mystery. Some believe that it is the result of a stage-by-stage integration of visual information in so-called convergence zones, which help you compare what you see with what you already know. Others suggest that when you fail to see something in plain view, it is simply because the neurons controlling attentive vision are not firing.

Whatever the case, the difficulties scientists have in explaining vision pale in comparison with the problems faced in determining just what "consciousness" and the "mind" really involve. Scanning techniques, such as magnetic resonance imaging and positron-emission tomography, have provided scientists with a new window on the human brain. And by observing the flow of blood to certain brain areas during thought processes, they have concluded with reasonable certainty that different regions of the cortex apparently help one to hear words, see words, and speak words. However, as one writer concludes, "the phenomenon of mind, of consciousness, is much more complex . . . than anyone suspected." Yes, much of the brain's mystery has yet to be unraveled.

The Brain—Just a Marvelous Computer?

To understand our complex brain, it may be helpful to make comparisons. At the beginning of the industrial revolution, in the mid-18th century, it became fashionable to compare the brain to a machine. Later, when telephone switchboards became a mark of progress, people compared the brain to a

busy switchboard with an operator who made decisions. Now that computers handle complicated tasks, some compare the brain to a computer. Does this comparison fully explain how the brain works?

Significant basic differences separate the brain from a computer. Fundamentally, the brain is a chemical system, not an electrical one. Numerous chemical reactions occur within each cell, and this is totally different from the workings of a computer. Also, as Dr. Susan Greenfield observes, "no one programmes the brain at all: it is a proactive organ, operating spontaneously." This is unlike a computer, which has to be programmed.

Neurons communicate with one another in a complicated way. Many neurons react to 1,000 or more synaptic inputs. To grasp what this involves, consider the research of one neurobiologist. He studied an area on the brain's underside just above and behind the nose to discover how we recognize odors. He notes: "Even this apparently simple task—which seems a pushover compared to proving a geometric theorem or understanding a Beethoven string quartet—involves about 6 million neurons, each one receiving perhaps 10 000 inputs from its mates."

The brain is, however, more than a collection of neurons. For every neuron, there are several glial cells. In addition to holding the brain together, they provide electrical insulation for the neurons, fight off infection, and join together to form a protective blood-brain barrier. Researchers believe that the glial cells may have other functions that are yet to be discovered. "The obvious analogy to man-made computers, which process electronic information in digital form, may be so incomplete as to be misleading," concludes the *Economist* magazine.

This still leaves us with another mystery to discuss.

What Are Memories Made Of?

Memory—"perhaps the most extraordinary phenomenon in the natural world," according to Professor Richard F. Thompson—Involves several different functions of the brain. Most students of the brain divide memory into two kinds, declarative and procedural. The procedural involves skills and habits. The declarative, on the other hand, involves storing facts. *The Brain—A Neuroscience Primer* itemizes memory processes according to the time they take: very short-term memory, which lasts about 100 milliseconds; short-term memory, which is of a few seconds' duration; working memory, which stores recent experiences; and long-term memory, which houses verbal material that has been rehearsed and motor skills that have been practiced.

One possible explanation of long-term memory is that it starts with activity in the front part of the brain. The information chosen for long-term memory passes as an electrical impulse to a part of the brain known as the hippocampus. Here a process called long-term potentiation enhances the neurons' ability to pass messages.—See the box "Bridging the Gap."

A different theory of memory stems from the idea that brain waves play a key part. Its proponents believe that regular oscillations of the brain's electrical activity, rather like the beat of a drum, help bind memories together and control the moment at which different brain cells are activated.

Researchers believe that the brain stores different aspects of memories in

Different areas of the brain process color, form, edge, and shape and also track movement



BRIDGING THE GAP

When a neuron is stimulated, a nerve impulse travels along the axon of the neuron. On reaching the synaptic bulb, it causes tiny globules (synaptic vesicles), each holding thousands of neurotransmitter molecules, which are within the bulb, to fuse with the bulb's surface and release their cargo across the synapse.

Through a complicated system of keys and locks, the neurotransmitter opens and closes input channels in the next neuron. As a result, electrically charged particles flow into the target neuron and cause additional chemical changes that either spark an electrical impulse there or inhibit further electrical activity.

A phenomenon called long-term potentiation occurs when neurons are regularly stimulated and release neurotransmitters across the synapse. Some researchers believe that this draws the neurons closer together. Others claim that there is evidence that a message feeds back from the receiving neuron to the transmitting neuron. This, in turn, causes chemical changes that produce yet more proteins to serve as neurotransmitters. These then strengthen the bond between the neurons.

The changing connections in the brain, its plasticity, give rise to the motto, "Use it or lose it." Thus, to retain a memory, it is helpful to recall it often.

different places, each concept being linked to the area of the brain that specializes in perceiving it. Some parts of the brain certainly contribute to memory. The amygdala, a small almond-size clump of nerve cells close to the brain stem, processes memories of fear. The basal ganglia re-



CNRI/Science Photo Library/PR

Axon

A signal-carrying fiber that links neurons

Dendrites

Short, many-branched connections that link neurons

Neurites

Tentaclelike projections from the neuron. There are two main types—axons and dendrites

Neurons

Nerve cells. The brain has about 10 billion to 100 billion neurons, "each connected to hundreds, sometimes thousands, of other cells"

Neurotransmitters

Chemicals that take a nerve signal across the so-called synaptic gap between a sending nerve cell, or neuron, and a receiving one

Synapse

The gap between a sending and a receiving neuron or nerve

Based on *The Human Mind Explained*, by Professor Susan A. Greenfield, 1996



gion is focused on habits and physical skills, and the cerebellum, at the base of the brain, concentrates on conditioned learning and reflexes. Here, it is believed, we store the skills of balance—for example, those we need to ride a bicycle.

Our brief glimpse of how the brain works has necessarily omitted details of

other remarkable functions, such as its timekeeping, its propensity for acquiring language, its intricate motor skills, and its way of regulating the body's nervous system and vital organs and of coping with pain. Then, still being discovered are its chemical messengers that link with the immune system. "The complexity is so incredible," observes neuroscientist David Felten, "that

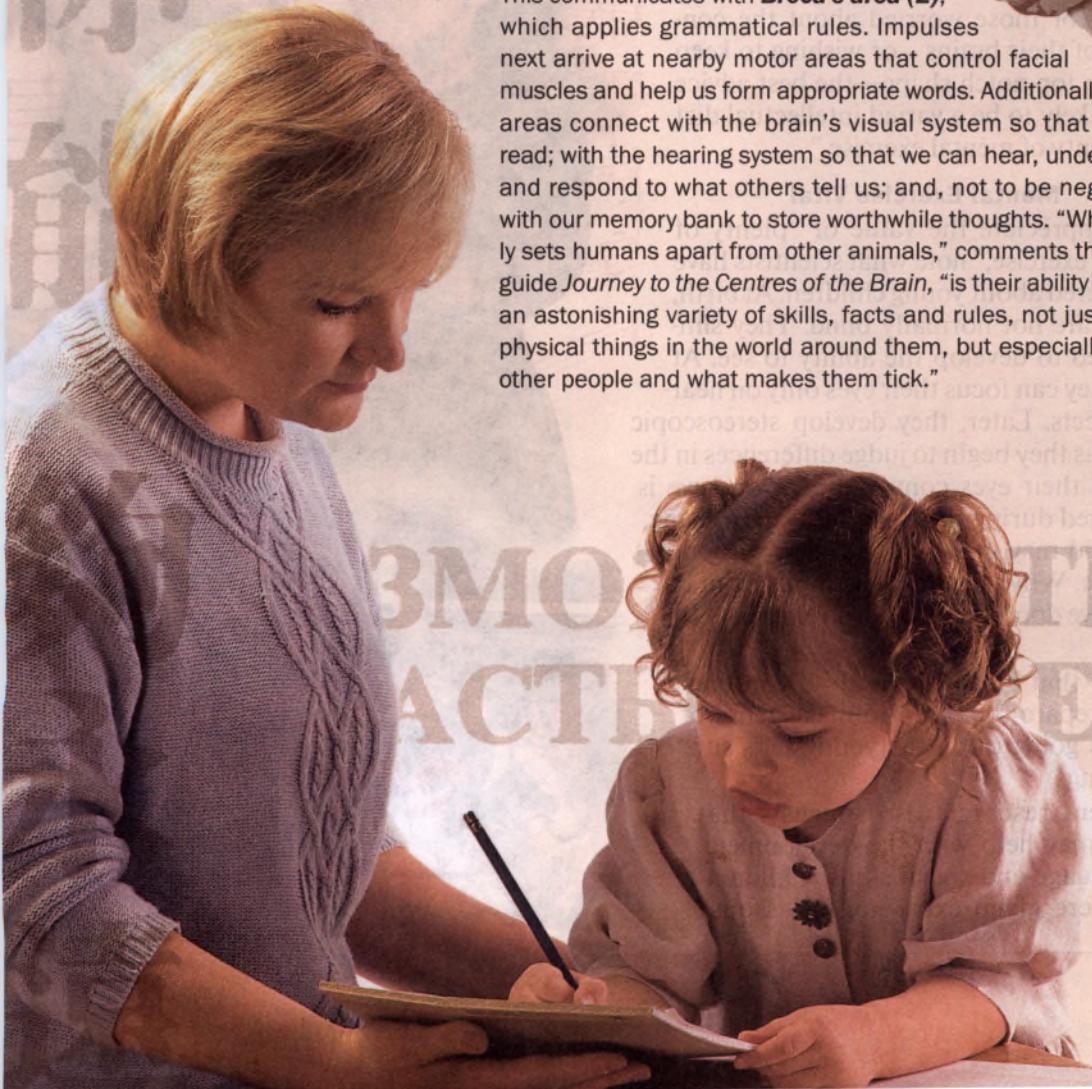
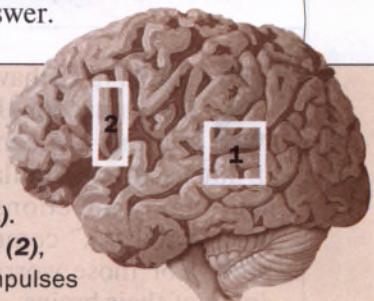
you wonder if there is ever any hope of working it out."

Although many of the brain's mysteries remain unsolved, this remarkable organ provides us with the capacity to think, to meditate, and to recall what we have already learned. But how can we make the best use of the brain? Our concluding article in this series provides an answer.

HUMANS' DISTINCTIVE ABILITIES

Specialized areas of the brain known as language centers equip humans with remarkable skills of communication. What we want

to say appears to be organized by the region of the left brain hemisphere known as **Wernicke's area (1)**. This communicates with **Broca's area (2)**, which applies grammatical rules. Impulses next arrive at nearby motor areas that control facial muscles and help us form appropriate words. Additionally, these areas connect with the brain's visual system so that we can read; with the hearing system so that we can hear, understand, and respond to what others tell us; and, not to be neglected, with our memory bank to store worthwhile thoughts. "What really sets humans apart from other animals," comments the study guide *Journey to the Centres of the Brain*, "is their ability to learn an astonishing variety of skills, facts and rules, not just about physical things in the world around them, but especially about other people and what makes them tick."



YOUR BRAIN

HOW CAN YOU BEST USE IT?

As you read these words, your brain evokes memories stored years ago when you first learned how to read. But to give wise and thoughtful consideration to what you learn, you need to develop the brain's thinking ability.

SCIENTISTS have discovered that the connections between the brain's neurons are continually changing. If not used or stimulated, neurons and neuronal connections die. "Brains improve with use," comments a recent report. "For those worried about the condition of their brains—or wishing to keep them in top-notch shape—the best advice looks likely to be a varied intellectual diet and plenty of mental exercise."

Mental Exercise Vital

To appreciate the value of "plenty of mental exercise," note what scientists have discovered about young children. At birth, babies are not normally blind. They simply need to develop the ability to see. At first, they can focus their eyes only on nearby objects. Later, they develop stereoscopic vision as they begin to judge differences in the images their eyes convey. But if one eye is bandaged during the time this is developing, the child may grow up with poor vision in that eye. Why? Because the input from the other eye dominates the visual cortex of the brain.

Toys that stimulate a child's interest help prepare the brain to make sense of what is going on in the youngster's surroundings.

Recent research also suggests that music may help with the development of language and social skills. Children who were given extra music lessons



proved to be better at language and learned to read more easily than those who were not. Those who played music together also demonstrated better cooperation with one another.

Although the brain is divided into two halves, the left and the right, each part plays a vital role. The right half, for example, generally helps us to perceive emotions and understand melodies. Nevertheless, the two parts are interconnected. When music students started their studies, notes one report, listening to music mainly activated their right brain hemispheres. Three years later, after detailed discussion of music theory and composition, their left hemispheres were busy analyzing what they heard. Consequently, mental exercise is needed to stimulate the whole brain so that analytic and emotional parts become involved.

"A Varied Intellectual Diet"

Many people have learned the creeds of the religion their family practiced. But as they began to reason on the teachings of these churches, they noted inconsistencies and a lack of real purpose. This has caused some to search for a system of belief that both answers their questions and gives them a sound hope for the future.

"My life had been one of many heartaches and problems, right from my early teens onward," explains Jean. "Although I was a member of the Church of England, I did not find direction or peace of mind. Many teachings of the church bothered me—for example, hellfire and the condition of the dead. Clergymen told me that God must be punishing me."

"At this stage I decided to leave the Church of England, and later I married a man who did not profess any religion. His violence at home distressed me." Jean then decided to commit suicide. But before she did, she offered one last prayer to God. At

that very moment, there was a knock at her door. On opening it, she found two women who were Jehovah's Witnesses. They talked about life having a purpose and gave Jean some Bible literature to help her learn more.

"After they left," Jean continues, "I went inside and immediately started to read the book they had left me. It felt as though a veil were being lifted from my eyes and I could see for the first time. The more I read, the clearer it became to me that this was the truth." Jean had found satisfying food for her mind.

The Bible book of Proverbs highlights the value of discernment and godly wisdom. However, to gain these, personal effort and a desire to learn about God are required. Proverbs chapter 2 throws out a challenge: "My son, if you will receive my sayings and treasure up my own commandments with yourself, so as to pay attention to wisdom with your ear, that you may incline your heart to discernment; if, moreover, you call out for understanding itself and you give forth your voice for discernment itself, if you keep seeking for it as for silver, and as for hid treasures you keep searching for it, in that case you will understand the fear of Jehovah, and you will find the very knowledge of God. For Jehovah himself gives wisdom; out of his mouth there are knowledge and discernment."—Proverbs 2:1-6.

Of the Bible, educator William Lyon Phelps wrote: "Everyone who has a thorough knowledge of the Bible may truly be called educated." Contact Jehovah's Witnesses locally or write to the nearest address listed on page 5. They will gladly help you discover how the Bible can answer your questions and provide a reliable source of rich mental stimulation. Use your brain's thinking ability to understand the pattern of truth that the Bible outlines. Making the best use of your brain in this way may lead to your everlasting happiness.

THE EURO

A JUBILANT French finance minister gave the fresh coin a bite and declared: "This is the real thing, it's no copy. It's the first produced in France as well as in Europe." The coin was the first euro struck at France's official mint. The date was Monday, May 11, 1998.

What is the euro? How will housewives, workers, tourists, and businesses across Europe be affected by it? Will there be any repercussions for the global economy? Before you throw away your deutsche marks, lire, or francs, you may do well to learn the answers to these questions.

How Did the Idea Develop?

When the Maastricht Treaty transformed the European Community into the European Union (EU), on November 1, 1993, one of the fundamental goals was to introduce a single currency for the member states.* Since Roman times, Europe has not shared such a single currency. It was decided that the name of the new currency would be the euro. Not all EU countries are participating in this monetary union. Only 11 of the 15 EU countries are now in a position to put the euro into use. These countries are Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain. Greece did not meet the economic criteria for participation. The other three

* For more information on the European Community, see *Awake!* issues of February 22, 1979, pages 4-8, and December 22, 1991, pages 20-4.



New
Currency
for an
Old
Continent

—Britain, Denmark, and Sweden—have opted out at present.

The introduction of the euro will be gradual. As of January 4 of this year, the euro began to be traded on international currency exchanges in noncash transactions. Euro coins and bank notes will be introduced over a six-month period starting on January 1, 2002—after

which the participants' former currencies will probably become the stuff of museums and memorabilia boxes. It has been estimated that the euro will replace 12 billion bank notes and 70 billion coins, a total weight of 300,000 tons. It is hoped that, in time, the remaining EU countries will also be in a position to enter the single-currency club.

Austria's finance minister said about the changeover to the euro: "We stand at the dawn of a new era in the integration of Europe." However, in Europe public opinion about the euro has been divided between the 47 percent who feel that the single currency will transform Europe into an economic powerhouse and the 40 percent who believe that the euro will cripple the European economy. Some have even suggested that the single currency may lead to war! In between are the undecided "Euroskeptics," those who see the advantages of having a single currency in Europe but question its eventual success.

Some View It as a Blessing . . .

The highest executive body of the EU, the European Commission, has declared: "By

creating the single currency, Europe will be offering its citizens, its children and its partners... a more concrete symbol of the common destiny it has freely chosen: that of building a community based on peace and prosperity."

Advocates of the euro cite the many potential benefits of a single currency. The elimination of foreign exchange costs would have the most direct impact. The example sometimes cited is that of the tireless European traveler who visits all 14 countries of the EU outside his own. If, for instance, he starts with 1,000 deutsche marks and changes his money in each country, he will end up with only 500 marks as a result of exchange costs alone!

Likewise, exports and imports will no longer bear the cost of foreign exchange. Similarly, a single currency will eliminate the indirect cost of currency fluctuations. When a country's currency loses value, imported goods become more expensive in that country. This often leads to inflation. Thus, under a single currency, without the risk of exchange rate changes, Europe should become more attractive to foreign investors.

Promoters of the euro also envision a reduction in prices across Europe. Customers and businesses alike are now able to compare prices easily, and when euro coins and bills are introduced in 2002, it will be even simpler. Differences in the price of the same product in various parts of Europe are expected to shrink, benefiting the consumer.

... Others View It as a Curse

Enter the critics. They feel that the euro will put the European economy in a straitjacket, destroying its flexibility and stifling its growth. They predict that a single currency will increase unemployment, attract massive speculative attacks on the money markets, and cause political tensions. Such political tensions have already been apparent.



Take, for example, the dispute between Germany and France over who should be the head of the European Central Bank, the overseeing watchdog for the euro. More rows like that one may be expected as each EU member state pursues its own agenda.

In some EU countries, unemployment is presently at record levels. Many blame the spending cuts and tax increases required to conform to the single-currency criteria as the cause of this. Across Europe there are protests against austere financial policies that include slashing generous welfare, pension, and health-care programs. How long can such strict financial discipline last? Will some countries be tempted to loosen their belts a little after the euro becomes a reality? Would such a lax policy then wreak havoc on the single European currency system?

Others point to the deep sentimental attachment people have to their country's currency. Currency is more than what is in your pocket. For many it is also their country's history, a symbol as significant as a flag. The national currency is the code in which a people earns, counts, estimates, deals, and saves. While the Germans, for example, will see the numbers on their bank accounts halved by



the euro conversion, the Italians' numbers will shrink sharply by a factor of 2,000 when the lira goes. According to one study, the switch to the euro will be a "traumatising" experience for many Europeans.

One Size Fits All?

Some economists in the EU and in the United States stress that although there is considerable political will for a single currency, Europe's economies are fragmented, its people are rooted in their home countries, and its cultures are immensely different. Thus, unlike residents of the United States, people in Europe who lose their jobs are less likely to pick up and move long distances to find work. Some experts believe that such fragmentation deprives the euro nations of the shock absorbers needed to share an economy and thus a currency.

Under the single currency system, critics say, individual governments will lose their flexibility in dealing with economic problems. They say that the euro will shift pow-



er from individual countries to the new European Central Bank, in Frankfurt, Germany. In turn, this will increase the pressure for coordination of tax rules and other economic policies throughout the continent. The critics argue that the executive and legislative bodies in Brussels and Strasbourg will gain power. Indeed, the Maastricht Treaty calls for a political union that will eventually be responsible for foreign and defense policies as well as for economic and social policies. Will this transition be smooth and trouble free? Only time will tell.

"A Huge Gamble"

In the meantime, banks and supermarkets are already starting the move to the euro, setting up euro accounts and posting euro prices next to those in local currencies. The goal is to make the switch in the year 2002 as smooth as possible. A popular French magazine has already distributed more than 200,000 calculators programmed to convert between French francs and euros.

Will the euro one day rival the U.S. dollar in power? Many feel that after the euro has gained acceptance, the United States will probably not enjoy as much of an easy ride on world economies. They predict that the euro will become a global reserve currency alongside the dollar. Jill Considine, of the New York Clearing House Association, says: "There's going to be a new competitive landscape."

What will the future of the euro be? German editor Josef Joffe calls the single currency "Europe's colossal coin toss" and "a huge gamble." He adds: "If it fails, it may contaminate much of what Europe has achieved in the last 50 years." The French finance minister echoed the feelings of many Europeans when he said: "There's a lot of optimism and a lot of fear."

Euro Fact Sheet

- € One euro is worth a little more than one U.S. dollar
- € Euro bills will be in seven denominations: 5, 10, 20, 50, 100, 200, and 500 euros
- € On one side the euro bills will have a map of Europe with some typical bridges, and on the other, representations of windows or gateways
- € The words "EURO" and "EYPΩ" will both appear on bank notes, to represent Roman and Greek lettering
- € Euro coins will be in eight denominations: 1, 2, 5, 10, 20, and 50 cents as well as 1 and 2 euros
- € The coins will have a universal European image on one side and a national image on the other



The AZTECS

THEIR FASCINATING STRUGGLE TO SURVIVE

"THE GRAND PLAZA WAS SWARMING WITH PEOPLE, SOME BUYING, OTHERS SELLING . . . THERE WERE SOLDIERS AMONG US WHO HAD TRAVELED TO MANY PARTS OF THE WORLD, TO CONSTANTINOPLE AND THROUGHOUT ITALY AND ROME, AND THEY SAID THAT THEY HAD NEVER SEEN SUCH A HARMONIOUS, WELL-BALANCED PLAZA THAT WAS SO LARGE AND WITH SO MANY PEOPLE."

Mural on pages 15-16: "Mexico Through the Centuries," original work by Diego Rivera. National Palace, Mexico City, Mexico

Aztec calendar





THE description just quoted is that given by Bernal Díaz del Castillo, a soldier in the army of the Spanish conquistador Hernán Cortés, when he saw the Aztec city Tenochtitlán in 1519.

According to the book *The Mighty Aztecs*, by Gene S. Stuart, when the Spaniards arrived, between 150,000 and 200,000 people dwelt in Tenochtitlán. Far from being a crude backwater, it was a sprawling metropolis, covering several square miles. It was a city of bridges, causeways, canals, and gleaming temples of worship. As the capital, Tenochtitlán was the very heart of the Aztec Empire.

But for many readers, this idea of a peaceful, harmonious Aztec city may contradict what they have heard, the popular notion that the Aztecs were little more than blood-thirsty savages. To be sure, the Aztecs believed that their gods needed human hearts and blood in order to remain strong. However, there was much more to Aztec culture and history than bloodletting. And to understand their struggle to survive is to comprehend better the tenacious fight for survival that their descendants undergo to this day.

The Rise of the Aztecs

In truth, the Aztecs occupied just a brief period in the history of Mesoamerican civilization.* Most researchers believe that Mexico's original inhabitants migrated from Asia across the Bering Strait to Alaska and from there worked their way south.—See *Awake!* of September 8, 1996, pages 4-5.

Archaeologists say that the most ancient culture known to have thrived in Mesoamerica was that of the Olmec. The Olmec civilization, according to some authorities, evidently arose about 1200 B.C.E. and may have prevailed for 800 years. But it wasn't until 1200 C.E.—over two thousand years later—that the Aztecs came to the fore. Their culture was to last a mere 300 years. And their mighty empire would exercise dominance for only a hundred years before it would fall to the swords of Spanish invaders.

At its zenith, however, the Aztec Empire reflected a grandeur that has seldom been matched. According to one source, “the

* The term “Mesoamerica” refers to the region “extending south and east from central Mexico to include parts of Guatemala, Belize, Honduras, and Nicaragua.” (*The American Heritage Dictionary*) Mesoamerican civilization refers to “the complex of aboriginal cultures that developed in parts of Mexico and Central America prior to Spanish exploration and conquest in the 16th century.”—*Encyclopædia Britannica*.





Aztec established an empire that stretched south to Guatemala."

The *World Book Encyclopedia* described it this way: "The Aztec had one of the most advanced civilizations in the Americas. They built cities as large as any in Europe at that time."

Legendary Origins

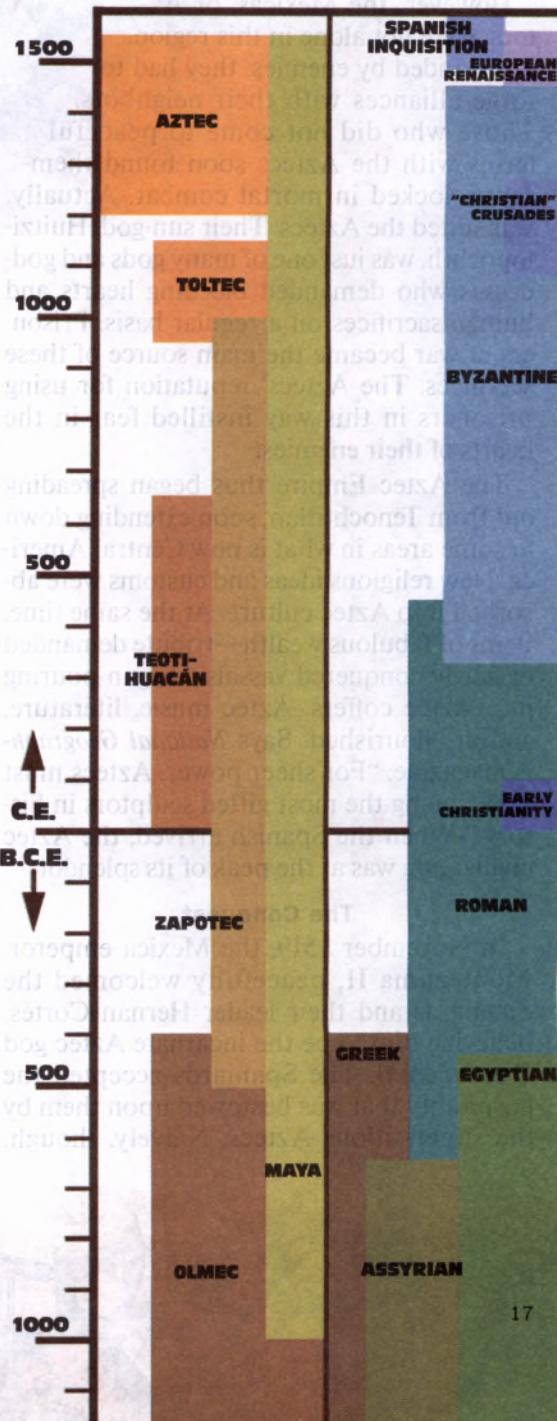
Despite the prominence of the Aztecs, little is known about their origins. According to legend, the name Aztec is derived from *aztlán*—a word that is thought to mean "white land." No one knows where the legendary Aztlán was, however, or if it ever really existed.

At any rate, according to legend, the Aztecs were the last of seven groups to depart from Aztlán. At the command of their god Huitzilopochtli, they began a long odyssey in search of a homeland. For many decades the tribe wandered, suffering incredible hardships and deprivations and engaging in virtually non-stop warfare with neighbors. But the wandering could not go on forever. According to the most popular legend, Huitzilopochtli told his followers to look for the following sign: an eagle on a cactus. This phenomenon was supposedly sighted at a muddy little island in Lake Texcoco. Here the wanderers finally settled down, building a city later known as Great Tenochtitlán (meaning "Stone Rising in the Water"). According to some, its name is derived from the name of a legendary patriarch called Tenoch. Today, Tenochtitlán is buried beneath Mexico City.

The Aztecs proved to be brilliant engineers and craftsmen. Using the lake bed as a foundation, they enlarged the city by creating landfills. Causeways of raised earth connected the island to the mainland. A series of canals were also built.

During this period of time, however, the builders were not generally known as Aztecs. According to legend, their god Huitzilopochtli had given them a new designation

COMPARATIVE CHRONOLOGY OF SOME OF THE MAIN CULTURES AND EVENTS IN AMERICA AND THE WORLD FROM 1200 B.C.E. TO 1550 C.E.



when they exited Aztlán —Mexicas. In time, the surrounding land and all its inhabitants would bear this name.

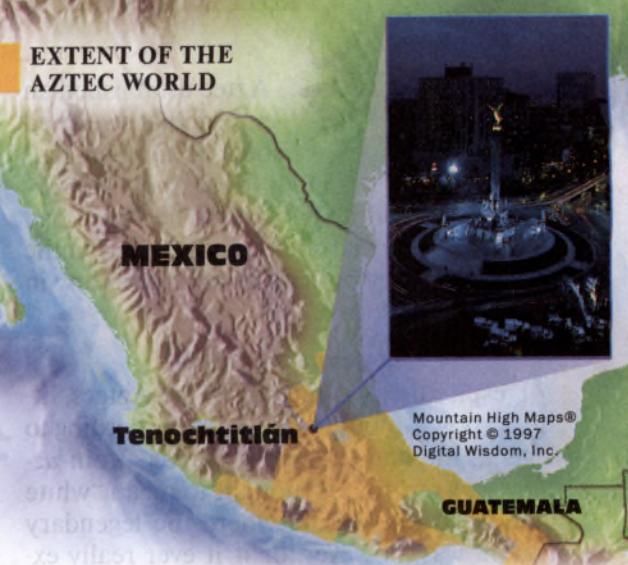
However, the Mexicas, or Aztecs, were not alone in this region. Surrounded by enemies, they had to forge alliances with their neighbors. Those who did not come to peaceful terms with the Aztecs soon found themselves locked in mortal combat. Actually, war suited the Aztecs. Their sun-god, Huitzilopochtli, was just one of many gods and goddesses who demanded bleeding hearts and human sacrifices on a regular basis. Prisoners of war became the main source of these sacrifices. The Aztecs' reputation for using prisoners in this way instilled fear in the hearts of their enemies.

The Aztec Empire thus began spreading out from Tenochtitlán, soon extending down to some areas in what is now Central America. New religious ideas and customs were absorbed into Aztec culture. At the same time, items of fabulous wealth—tribute demanded of newly conquered vassals—began pouring into Aztec coffers. Aztec music, literature, and art flourished. Says *National Geographic* magazine: "For sheer power, Aztecs must rank among the most gifted sculptors in history." When the Spanish arrived, the Aztec civilization was at the peak of its splendor.

The Conquest

In November 1519, the Mexica emperor, Montezuma II, peacefully welcomed the Spaniards and their leader Hernán Cortés, believing him to be the incarnate Aztec god Quetzalcoatl. The Spaniards accepted the hospitality that was bestowed upon them by the superstitious Aztecs. Naively, though,

EXTENT OF THE AZTEC WORLD



The great city known as Tenochtitlán lies buried beneath modern-day Mexico City

the Aztecs allowed the Spaniards to see Tenochtitlán's treasures of gold. Cortés feverishly plotted to confiscate it all. In an act of considerable bravado, Cortés made Montezuma a prisoner in his own city. Some say Montezuma acquiesced virtually without protest. At any rate, Cortés succeeded in conquering the capital city of a huge empire without firing a shot.

But the bloodless victory did not stay bloodless for long. Cortés suddenly had to depart for the coast to handle an emergency, leaving an impulsive man named Pedro de Alvarado in charge. Fearing that without Cortés there, the people of Tenochtitlán would soon rise against him, Alvarado decided to strike first. He massacred a number of Aztecs during a festival. Cortés returned to find the city in turmoil. During the battle that then erupted, Montezuma was killed, perhaps by the Spanish. According to the Spaniards' version of the events, however, Cortés prevailed upon Montezuma to make



an appearance and appeal to his people to cease the fighting. When he did so, Montezuma was stoned to death by his own people. In any event, Cortés and a few wounded survivors escaped with their lives.

Exhausted and injured, Cortés regrouped his forces. The Spaniards were joined by nearby tribes who hated the Aztecs and were eager to shake off their yoke. Cortés now returned to Tenochtitlán. During the bloody siege that followed, the Aztecs reportedly offered up captured Spanish soldiers as sacrifices. This enraged Cortés' men and increased their determination to win at all costs. The former vassal tribes, according to one Aztec writer, took matters into their own hands, "cruelly retaliating for the past deeds of the Mexicas [Aztecs] and ransacking all their possessions."

On August 13, 1521, Great Tenochtitlán fell. The Spaniards and their allies now completely dominated the Mexicas. *National Geographic* stated: "Within a historical eye blink Mesoamerica's great cities and ceremonial centers were left in ruins as Spaniards scoured the land for gold. Native peoples were enslaved and Christianized, and the Aztec Empire, the last great indigenous civilization, dissolved."

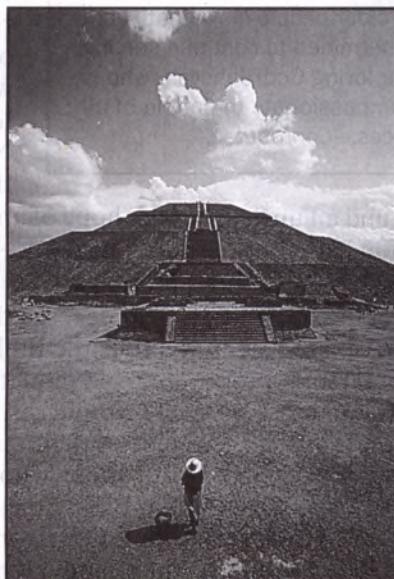
Conquest brought more than political change. The Spanish brought with them a new religion—Catholicism—and often imposed it upon the Mexicas by the sword. Granted, the Aztec religion was bloodthirsty and idolatrous. But far from uprooting all vestiges of paganism, Catholicism formed a curious partnership with the Aztec reli-

gion. Tonantzin, the goddess worshiped on Tepeyac Hill, was replaced by the Virgin of Guadalupe, the Basilica of Guadalupe standing at the exact spot where Tonantzin was once revered. (The basilica supposedly marks the spot where the Virgin Mary made a miraculous appearance.) During sacred religious holidays held in honor of the Virgin, worshipers spin to the rhythm of their pagan ancestral dances right in front of the basilica.

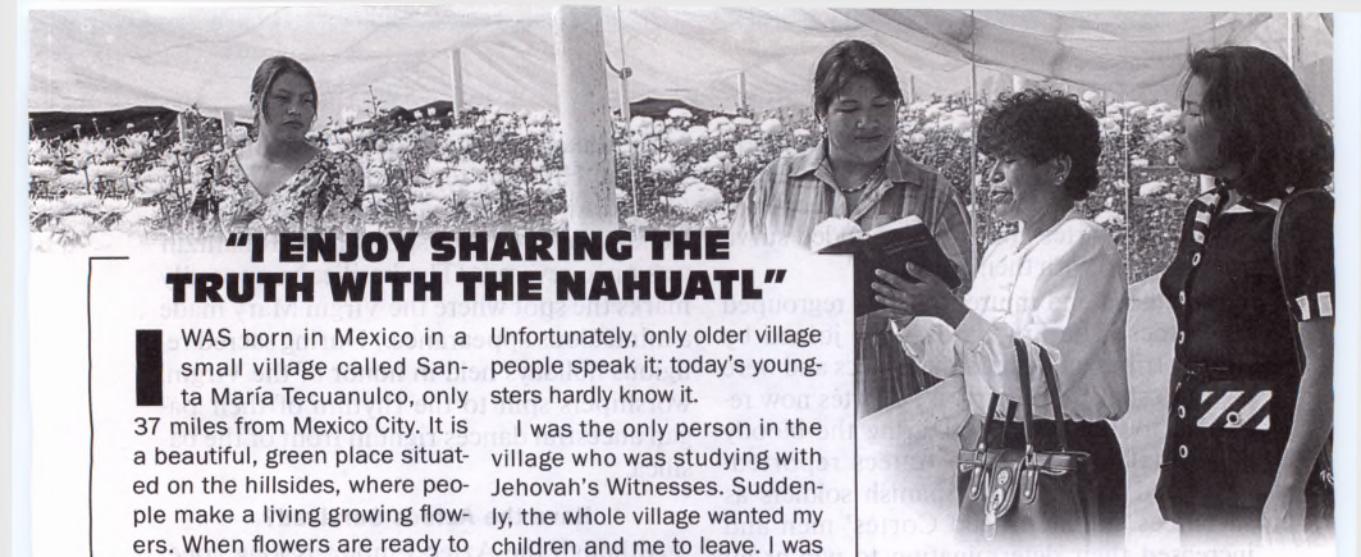
Have the Aztecs Survived?

Although the Aztec Empire is long gone, its influence is still felt today. English words, such as "chocolate," "tomato," and "chili," have been borrowed from the Aztec language, Nahuatl. Furthermore, the majority of the population of Mexico consists of descendants of Spanish conquerors and of indigenous races.

In many parts of Mexico, the old indigenous cultures continue to prevail, as some ethnic groups are trying to preserve their ancestral traditions. Altogether, there are 62 acknowledged indigenous groups and 68 registered dialects in the Mexican Republic. A recent study made by the *Instituto Nacional de Estadística, Geografía e Informática* (National Statistics Institute of Geography and Computing) concluded that over five million people aged five and older speak one of the indigenous languages. Said *National Geographic* magazine: "Powerless and poor through eras of colonization, dictatorship, and revolution, survivors have



The Aztecs used the Teotihuacán Pyramid of the Sun for their worship



"I ENJOY SHARING THE TRUTH WITH THE NAHUATL"

I WAS born in Mexico in a small village called Santa María Tecuanulco, only 37 miles from Mexico City. It is a beautiful, green place situated on the hillsides, where people make a living growing flowers. When flowers are ready to be picked, it is a delight to see many colors everywhere. Everyone in Santa María used to speak Nahuatl, an ancient Mexican language. I remember that each house had a name for identification purposes, in Nahuatl, of course. The name of my house was Achichacpa, meaning "Where Water Flows." In order to provide my address, I would tell people the names of the houses surrounding mine. Even today, many houses have a name. I learned Spanish in 1969, at the age of 17. I think Nahuatl is a beautiful language.

Unfortunately, only older village people speak it; today's youngsters hardly know it.

I was the only person in the village who was studying with Jehovah's Witnesses. Suddenly, the whole village wanted my children and me to leave. I was pressured to give regular contributions to the Catholic Church, which I refused to do. My relatives wouldn't even talk to me. Despite the strong opposition in my village, I got baptized in December 1988. I thank Jehovah that my three daughters serve as full-time evangelizers and that my son is a baptized Christian. I enjoy sharing the good news in Santa María. I preach to older people in Nahuatl. I am determined to continue serving our loving God, Jehovah, who is compassionate to people of all races.—Contributed.

salvaged languages, folkways, and an unshakable vision of self-determination."

Even so, most descendants of the proud Aztecs live in poverty, often eking out a living on tiny farms. Many live in isolated areas where education is scarce. Economic progress has thus proved difficult for most native Mexicans. And their plight is typical of indigenous people throughout Mexico and Central America. Voices have been raised in their behalf. Rigoberta Menchú, a Guatemalan Nobel Prize winner, made this stirring appeal: "We must erase the existing barriers

Bible's hope of an incoming world government, or "kingdom."—Daniel 2:44; see the box on this page.

Some resist the idea of teaching indigenous people the Bible. They may feel that the religion of Nahuatl-speaking people—a mixture of Catholicism and old Aztec paganism—is a part of their culture that must be preserved. But those who have opened their hearts to the Bible's message have experienced a true liberation from superstition and religious falsehood. (John 8:32) For the thousands of Aztec descendants, the Bible offers the only true hope of survival.



COMENIUS

THE GRANDFATHER OF MODERN EDUCATION

BY AWAKE! CORRESPONDENT IN THE CZECH REPUBLIC

AS A teacher, John Comenius was well aware of the shortcomings of the 17th-century school system in which he worked. True, no educational system had ever been perfect, but the school system of 17th-century Europe was just plain dreadful.

Rather than stand on the sidelines hurling complaints or accusations, Comenius decided to do something about it. What did he do, and why did he do it? Furthermore, what can we learn from the man who is called the grandfather of modern education?

Upbringing and Education

John Amos Comenius (Jan Ámos Komenský, in his native Czech) was born on March 28, 1592, in Moravia, a region in what is today known as the Czech Republic. He was the youngest of five children, being the only son of a fairly well-to-do couple of the peasant class.

His parents were members of the Unity of Brethren (later known as the Bohemian Brethren or the Moravian Church), a religious group that originated in the mid-15th century under the influence of the Waldenses and other Reformers such as Peter Chelčický. After completing his education in Germany, Comenius returned to his homeland. Later, at 24 years of age, he was ordained as a priest of the Unity of Brethren.

Why He Went Into Exile

In 1618, Comenius took charge of a small parish at Fulnek, which is located some 150 miles east of Prague. At the time, the Catholic Counter-Reformation against Protestantism was well under way in Europe. Tensions between Catholics and Protestants

continued to mount until, finally, the Thirty Years' War (1618-48) erupted.

After a decade of fighting, the Roman Catholic religion was declared the only lawful religion in Moravia. Comenius and members of the upper classes were given a choice—accept Catholicism or leave the country. Since Comenius was not about to be converted, he moved his family abroad to the small town of Leszno, a prominent center of activity for the Unity of Brethren in Poland. This marked the beginning of an exile that would last 42 years. Never again would he settle in his native land.

"Slaughterhouses of the Mind"

Comenius found work teaching Latin at the Leszno Gymnasium—a preparatory school for college students. Within a short period of time, though, he became dissatisfied with the inept methods of teaching—and with good reason.

The school system of Comenius' day was in a deplorable state. Only males, for instance, were deemed worthy of receiving an education, although males who were born into poverty were excluded. Classroom instruction consisted mainly of stuffing Latin words, sentences, and syntax into the students' heads. Why? Because most medieval schools were controlled by the Catholic Church, which conducted its liturgy in Latin. Therefore, teaching Latin was essential to ensure a steady supply of recruits for the priesthood.

Additionally, no thought was given to establishing specific goals for learning, nor was instruction designed to lead students gradually from simple ideas to complex ones.

Discipline was strict, sometimes brutal, and the moral climate was horrible.

Little wonder, then, that Scottish educator Simon Laurie once described 17th-century schools as "hopelessly haphazard" and "uninteresting." Comenius was even more pointed. He called schools "slaughterhouses of the mind."

A New Teaching Method Emerges

Comenius was not the first to speak out about the need for educational reform. In England, Francis Bacon had decried the emphasis on Latin and suggested a return to the study of nature. Wolfgang Ratke and John Valentine Andreae in Germany as well as others also attempted improvements. All of these, however, failed to gain official backing for their ideas.

Comenius proposed a system that made learning fun, not drudgery. He called his educational scheme *pampaedia*, meaning "universal education." His goal was to establish a progressive system of teaching that everyone could enjoy. Children should be taught in incremental steps, he said, with elementary concepts naturally leading up to more complex ones. Comenius also promoted the use of the mother tongue during the first few years of school rather than Latin.

Education, however, should not be confined to adolescence but should embrace one's entire life course. Comenius wrote that study should be "entirely practical, entire-

ly pleasurable, and such as to make school a real game, i.e., a pleasant prelude to our whole life." He also believed that school should focus on educating not just the mind but the whole person—that it should include moral and spiritual instruction.

The Works of John Comenius

The first of Comenius' works to be published in the field of teaching was *The School of Infancy*, in 1630.* It was designed as a helper for mothers and nannies to use when instructing children at home. This was followed in 1631 by *The Gate of Languages Unlocked*, which virtually revolutionized the teaching of Latin. It was arranged with parallel columns of text, one in Czech and one in Latin. Thus, the two languages could easily be compared, making it much easier to learn. His revised edition of this teaching aid was so well received that eventually it was translated into 16 languages.

The most famous and perhaps simplest work by Comenius was *The Visible World*, an illustrated reading guide for children. It too was a milestone in the history of education. Ellwood Cubberley, a 20th-century professor of education, says that it "stood without a competitor in Europe for a hundred and fifteen years; and was used as an introductory textbook for nearly two hundred years." Many of today's illustrated textbooks, in fact, still follow the general format of Comenius' work, using illustrations as teaching aids.

Comenius was soon hailed as a genius. Throughout all Europe scholars looked to him as a leader and sought his advice. According to the book *Magnalia Christi Americana*, Comenius' fame grew to the point that in 1654 he was invited to serve as the president of Harvard University, in Cambridge, Massachusetts. Comenius refused, however, for he was not seeking fame, glory, or high office.

IN OUR NEXT ISSUE

Child Labor—Its End in Sight!

A New Defense in the Fight Against Tuberculosis

How Can I Conquer My Obsession With Weight?

* In 1657, Comenius published in Latin *The Great Didactic* as part of the *Opera Didactica Omnia*.



SOME TEACHING PRINCIPLES OF JOHN COMENIUS

On the amount of teaching matter: "The teacher should teach not as much as he himself can teach but as much as the learner can grasp."

On teaching methods: "To teach well is to enable someone to learn rapidly, agreeably, and thoroughly."

"A capable teacher [is] one who knows how to bear the ignorance of his students patiently and also how to dispel that ignorance effectively."

"To teach means scarcely anything more than to show how things differ from one another in their different purposes, forms, and origins. . . . Therefore, he who differentiates well teaches well."

On logical connection: "Whatever does not make sense can be neither understood nor appraised and hence cannot be committed to memory."

"When particulars are lacking, it is almost impossible to understand or judge a matter and equally impossible to commit it to memory."

On comprehension: "To understand anything is largely a matter of perceiving why and how that thing in any one of its parts is related to something else and how and to what extent it differs from other things that are similar to it."

"It has been well said that we should read a thing once to find out what it contains; a second time, to understand it; a third time, to imprint it on our memory; the fourth time we should repeat it silently to test ourselves whether we have firmly mastered it."

A page from "The Visible World,"
1883 edition



CVI.

Ars oratoria.	Umění řečnické.	Die Rede-kunst.	L'Art oratoire.
Grammatica ¹⁾ .	Mluv-nice ¹⁾ .	Die Sprach-lehre ¹⁾ be-schäftigt sich mit Buchsta-ben ²⁾ , aus welchen sie Worte ³⁾ zu-sammensetzt,	La gram-maire ¹⁾ s'occupe des lettres ²⁾ , dont elle combine des mots ³⁾ , lesquels elle apprend à bien prononcer et écrire ⁴⁾ .
versatur in litteris ²⁾ ,	zanáší se písmeny ²⁾ ,	ze kterých	
e quibus componit voces ⁴⁾ ,	skládá slova ³⁾ ,	jež něčí dobré	und lehrt diese recht aus-
quas docet recte eloqui et scribere ⁴⁾ ,	vyslovovati a spáti ⁴⁾ ,	vyslovovati	sprechen und schreiben ⁴⁾ ,
construere et inter-pungere.	skládati a rozdě-lovatí.	a rozdě-lovati.	zusammenfü-gen u. theilen.

Orbis pictus.



What Motivated Him?

After considering Comenius' life course, one cannot help but wonder what motivated him. Comenius viewed education as a unifying force for mankind. He maintained that universal education could help preserve world peace.

Comenius also linked knowledge to godliness. He believed that by acquiring knowledge, mankind is ultimately directed to God. And that may have been his primary motive.

Comenius' insights on education are still valid today. His systematic teaching methods, including the use of visual aids, are employed worldwide—for example, in the literature published by the Watch Tower Bible and Tract Society. Individually, each of us can benefit by using his methods when engaging in personal Bible study or when conducting a family Bible study. How?

"Students should not be overburdened with matters that are unsuitable to their age, comprehension, and present condition," wrote Comenius. So when teaching your children about the Bible or any other subject, try to adapt the lessons to them. Rather than use a formal question-and-answer method, why not tell them stories about Bible characters?

A German primer of 1775, incorporating Comenius' principles of teaching

Get them involved, perhaps by letting them draw pictures of Bible events or encouraging them to act out Bible dramas. Use your imagination! The results will be worth the effort.
—Proverbs 22:6.

Also take full advantage of illustrated literature that is designed especially for teaching young people progressively, such as *My Book of Bible Stories* and *Questions Young People Ask*

—Answers That Work.* And when teaching Bible students of any age, take the initiative to make their experience "entirely practical, entirely pleasurable."

A Lasting Legacy

When fire swept through the town of Leszno in 1656, Comenius lost almost everything he owned. Thankfully, though, he left behind riches of another sort. The book *A Brief History of Education* says: "Comenius . . . shifted the whole emphasis in instruction from words to things, and made the teaching of scientific knowledge and useful world information the keynote of his work."

Indeed, Comenius can be given credit for turning teaching into more of a science. His teaching methods virtually revolutionized the classroom. American educator Nicholas Butler said: "The place of Comenius in the history of education is one of commanding importance. He introduces and dominates the whole modern movement in the field of elementary and secondary education." Jehovah's Witnesses, avid students of the Bible, also have reason to thank the grandfather of modern education.

* Published by the Watchtower Bible and Tract Society of New York, Inc.

NATIVE AMERICANS AND THE BIBLE

EVER since Europeans invaded the Americas, many have tried to teach the Native Americans the Bible.

Since the 17th century, the complete Bible has been translated into six North American Indian languages. The first was John Eliot's Bible, printed in 1663 for the Massachusetts Indians near Boston and Roxbury, Massachusetts. Writing in the *Encyclopedia of North American Indians*, Harvey Markowitz states: "Though many historians now question the sincerity with which most of the colonists entered into [a] compact [that is, "to 'civilize' the New World's 'savages'"], the depth of Eliot's commitment is witnessed by the fifteen years he toiled in learning Massachusetts and devising an orthography to transcribe the Bible. Eliot viewed this difficult undertaking as 'a sacred and holy work, to be regarded with fear, care, and reverence.'"

Although portions of the Bible were translated into other Native American languages, it took two hundred years before the next complete Bible was published, a version in Western Cree (1862) by associates of the British and Foreign Bible Society. Other translations soon followed: Eastern Arctic Inuit (1871); Dakota, or Eastern Sioux (1880); and Gwich'in, a subarctic American language (1898).

The latest complete Bible is the Navajo translation, published in 1985 after 41 years of preparation and collaboration between two Bible societies. Portions of the Hebrew and Greek Scriptures now exist in at least 46 Indian languages.

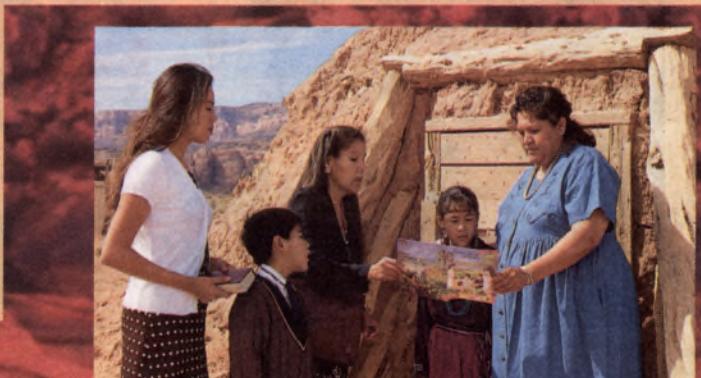
**"Jehovah"
appears in the
Navajo Bible at Psalm 68:4**

Who Have Taken the Lead?

Markowitz says: "It is significant . . . that the work of translating the Bible has been an overwhelmingly Protestant endeavor." The same writer goes on to say that prior to the Second Vatican Council (1962), the Catholic Church "discouraged the dissemination of Bibles among the laity, believing that laypeople lacked the proper . . . training to achieve correct interpretations of biblical texts."

Various Bible societies are presently involved in at least 20 projects for translation into languages of the Native Americans of North America, including Cheyenne, Havasupai, Micmac, and Zuni. A new version of the Greek Scriptures is being prepared for the Navajo nation. Other translations are being prepared for the Indians of Central and South America.

Jehovah's Witnesses are not affiliated with any Protestant organizations. However, they are active among all the Native Americans, and as a result, many Native Americans are responding to the Bible's truths regarding the "new heavens and a new earth," in which righteousness is to dwell. (2 Peter 3:13) The Witnesses are using the Bibles that are currently available in the native languages of the Americas. They also use Bible literature translated by the Watch Tower Society in several Native American tongues, including Aymara, Cree, Dakota, Guarani, Inuktitut, Iroquois, Navajo, Quechua, and nine other languages.—See *Awake!* of September 8, 1996.



How Should Christians View the Mass?

DEVOULT Catholics agree with Pope John Paul II, who, according to *The New York Times*, recently "reaffirmed that the church considers it a sin if a Catholic misses Mass." What is the Mass? Do the church and the Bible agree on the subject?

In the book *Things Catholics Are Asked About*, Catholic priest Martin J. Scott defines the Mass as follows: "The Mass is the *unbloody* sacrifice of the Body and Blood of Christ. Calvary was the *bloody* sacrifice of Christ. The Mass is essentially the same sacrifice as that of the cross. This is no figure of speech, no metaphor, or exaggeration." He also states: "The Mass claims to bring down on our altars the Son of God, and to offer Him in sacrifice to the Godhead."

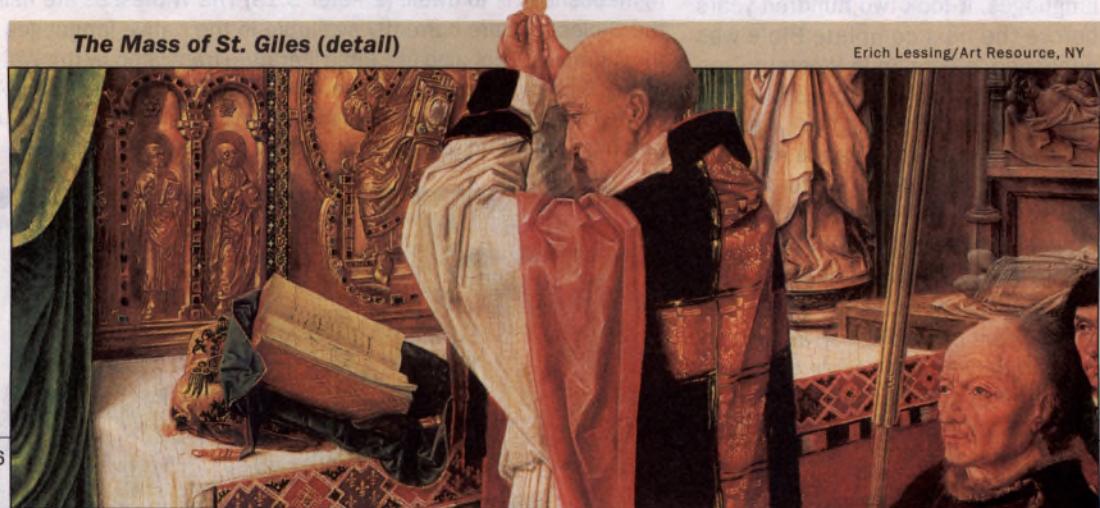
Is the Mass Scriptural?

Sincere Catholics believe that the Mass is based on Scriptural teaching. As proof, they point to Jesus' words during what is commonly called the Last Supper. As he distributed bread and wine to his apostles, Jesus

said when referring to the bread: "This is my body." When referring to the wine, he said: "This is my blood." (Matthew 26:26-28)* Catholics believe that when he uttered these words, Jesus actually transformed the bread and wine into his body and blood. However, the *New Catholic Encyclopedia* (1967) cautions: "We should not rely too heavily on the literalness of the words 'This is my body' or 'This is my blood.' . . . For in phrases such as 'the harvest is the end of the world' (Mt 13.39) or 'I am the true vine' (Jn 15.1) the [verb "to be"] means only to signify or represent." Thus, even this authoritative encyclopedia admits that the wording of Matthew 26:26-28 does not prove that the bread and the wine were changed into Jesus' literal body and blood at the Last Supper.

Someone might recall that Jesus once said: "I am the living bread which has come down from heaven. . . . Anyone who does eat my

* All Scripture quotations in this article are from the Catholic *New Jerusalem Bible*.



flesh and drink my blood has eternal life.” (John 6:51, 54) Some of those listening to Jesus took his words literally and were shocked. (John 6:60) But we might ask, Did Jesus transform his flesh into bread on that occasion? Certainly not! He was speaking figuratively. He compared himself to bread because through his sacrifice he would impart life to mankind. John 6:35, 40 clearly indicates that the eating and drinking would be done by exercising faith in Jesus Christ.

Since the Mass is a principal rite of the Catholic Church, one might expect the Scriptures to support it. They do not. *The Catholic Encyclopedia* (1913 edition) explained why: “The chief source of our doctrine . . . is tradition, which from the earliest times declares the imperative [entreating] value of the Sacrifice of the Mass.” Yes, the Roman Catholic Mass is based on tradition, not the Bible.

No matter how sincerely held, a tradition that contradicts the Bible is unacceptable to God. Jesus reproached the religious leaders of his day: “You have made God’s word ineffective by means of your tradition.” (Matthew 15:6) Since Jesus valued God’s Word, let us examine the teaching regarding the Mass in the light of the Holy Scriptures.

Christ Sacrificed—How Often?

The Catholic Church teaches that each time the Mass is celebrated, Jesus is sacrificed, although it maintains that he does not actually die and that the sacrifice is bloodless. Does the Bible agree with this view? Note Hebrews 10:12, 14: “[Jesus] has offered one single sacrifice for sins, and then taken his seat for ever, at the right hand of God. By virtue of that one single offering, he has achieved the eternal perfection of all who are sanctified.”

However, a sincere Catholic may object: ‘Wouldn’t Jesus have to offer himself often? We all sin many times.’ The Bible’s answer is recorded at Hebrews 9:25, 26: “[Christ] does not have to offer himself again and again.

. . . He has made his appearance once and for all, at the end of the last age, to do away with sin by sacrificing himself.” Note this well: Christ “does not have to offer himself again and again.” At Romans 5:19, the apostle Paul explains why: “By one man’s disobedience [Adam’s] many were made sinners, so by one man’s act of justice [Jesus’] are many to be made upright.” Adam’s single act of disobedience made all of us subject to death; Jesus’ single redemptive act laid the basis for all of us who exercise faith in that sacrifice to have our sins forgiven now and to enjoy everlasting life in the future.

What difference does it make whether Jesus was sacrificed once or whether he is sacrificed often? It is a matter of appreciation for the value of Jesus’ sacrifice. That is the greatest gift ever given—a gift so precious, so perfect, that it will never need to be repeated.

Jesus’ sacrifice certainly deserves to be remembered. But there is a difference between remembering an event and repeating it. For example, a couple celebrating their wedding anniversary may remember the day they got married, without actually repeating the ceremony. Each year, Jehovah’s Witnesses observe the anniversary of Jesus’ death, doing so in the way that Jesus commanded—“in remembrance,” not in sacrifice, of him. (Luke 22:19) In addition, throughout the year these Christians strive to cultivate a warm relationship with Jehovah God through Jesus Christ by bringing their lives, their actions, and their beliefs into harmony with the Sacred Scriptures.

Often, doing so means making changes in their thinking. But the Witnesses rejoice in the knowledge that if they loyally support God’s Word rather than human tradition, they will be blessed. And if they exercise faith in the sacrificed blood of Jesus, shed once and for all almost two thousand years ago, it will cleanse them from all sin.—1 John 1:8, 9.

WATCHING THE WORLD

Preparing for the Year 2000

"The year 2000 may bring technological chaos, but the [U.S.] Federal Reserve Board wants to make sure that whatever happens, Americans will be able to buy groceries in the new millennium," states *The Wall Street Journal*. "The central bank has ordered an additional \$50 billion of new currency to pump into circulation in case consumers make a run on their banks and automated teller machines." The extra currency should be ready by the end of September 1999. Older computers that use only the last two digits to identify years may interpret the year 2000 as 1900. Some experts fear that some computers will fail because of this glitch, known as the Y2K. The problem can be solved by extensive, time-consuming reprogramming, but many banks and companies have only recently begun such programming. "Some public concern over the potential financial gridlock is being heightened by evangelical religious groups that consider the end of the millennium as a sign of dire biblical prophecy" and a "potential breakdown of society," says the report.

Sleeping Sickness Returns

In 1974, Angola reported three cases of sleeping sickness. Recently, the World Health Organization estimated the number of cases there to be at least 300,000. Thousands, perhaps millions, more may be at risk. Sleeping sickness results from the bite of the tsetse fly. Af-

ter sucking the blood of a human infected with a parasite, the fly moves on to infect its next victim. People working in fields or washing clothes in a river—and, even more so, infants strapped to their mothers' backs—are vulnerable. Victims initially suffer headache, fever, and vomiting. Unable to sleep at night, they usually doze during the day. The parasite invades the central nervous system and finally the brain, resulting in insanity, coma, and death. Breaking the cycle of contamination and treating the victims is costly and difficult—about \$90 a treatment, "a small fortune in Angola," reports *The Daily Telegraph* of London.

Keeping Fit



"Physical activity doesn't have to be very hard to improve your health," says *The Physical Activity Guide*, recently released by Health Canada. As reported in *The Toronto Star*, "you can improve your fitness and your heart by doing light activity for 10-minute periods and add them up for an hour's worth each day." What are some of the recommended activities? They include walking, stair climbing, gardening, and stretching. Such household chores as vacuuming or mopping also count, and they build flexibility. The guide sug-

gests that the goal of accumulating 60 minutes a day "can be reached by building physical activities into your daily routine." Says Dr. Francine Lemire, president of the College of Family Physicians of Canada: "If you are inactive, studies show that the health risk could be on par with smoking."

Computer Danger in the Air

"Experts believe that one day a small personal electronic device (PED) such as a laptop, mobile phone, CD player or game computer is going to cause as much carnage on an aircraft as a terrorist's bomb," states *The Daily Telegraph* of Sydney, Australia. "A new report documents 50 incidents where commercial aircraft have suffered potentially catastrophic in-flight problems because of passengers using personal electronic devices." An example given was that of an aircraft on descent into the airport at Melbourne, Australia. The plane, on automatic pilot, suddenly lurched to the left, banking about 30 degrees. But no one had touched the controls. An investigation revealed that a passenger in the third row was using his laptop computer, despite the pilot's clear instructions that all electronic equipment be turned off. Such devices have caused aircraft to climb, dive, change course, and even depressurize during flight. The electronic signals from PEDs can be picked up by the plane's automatic navigation systems and can affect them. Passengers seated in the front of the plane create the biggest problem, as they are directly above the plane's electronic bays.

New Cesarean-Section Method

"A new method of cesarean section could result in faster and more gentle deliveries," reports the German newspaper *Augsburger Allgemeine*. "Using the Misgav-Ladach method, the surgeon manually stretches fat tissue, the abdominal wall, and muscles of the woman giving birth, instead of cutting them with the scalpel as hitherto." Since cutting is limited to a minimum, bleeding is less serious, and only three layers of skin and tissue have to be stitched afterward, compared with seven using the common method. Further, the method is less time-consuming, it has a lower risk of infection, fewer pain-relieving drugs are needed, and the women can leave the hospital after three to five days. The method is named after the hospital in Israel that was first to test it.

Not the Desired Effect

City traffic often puts severe strain on a driver's patience. A study conducted by psychologists at La Sapienza University, in Rome, has revealed that as traffic increases, so do the expletives directed toward religious subjects. According to the newspaper *Corriere della Sera*, on rural highways "54 percent of swearwords and behavior disrespectful of religion" were provoked by traffic-related problems. In big-city traffic, however, the "tendency to blame saints and madonnas" is more evident. "These days in the metropolises, 78 percent of profanities, commonly known as swearwords or oaths, are caused by traffic," said the newspaper. Traffic has recently become a bigger problem in Rome because of construction in prepa-

ration for the year 2000, which has been declared a Catholic Jubilee year in which indulgences will be offered. "It is paradoxical but true," comments the coordinator of the lay Jubilee Watcher, "that in Rome the first effect of the Jubilee may be the multiplication, not of indulgences, but of swearwords."

The Mighty Tardigrade



The tardigrade, an animal less than half a millimeter in length, is thought to be the toughest form of life on earth, reports the magazine *New Scientist*. Commonly called a water bear because of its chubby appearance under a microscope, it has eight legs and looks as though it were covered with armor plating. It can survive temperatures from -460 degrees Fahrenheit to 300 degrees Fahrenheit, exposure to X rays or to a vacuum, and pressures six times greater than those at the bottom of the deepest ocean. It can be found in roof gutters and between cracks in paving stones. Some of these little creatures have even been revived after lying dormant for more than 100 years in museum collections of dried moss. What makes this possible? A state of suspended animation when "the volume of the body is reduced by 50 per cent or more, accompanied by an almost total loss of water," says Professor Kunihiro Seki, of Kanagawa University, in Japan.

Soothing Passengers With Classical Music

Passengers now listen to classical music by such composers as Strauss, Vivaldi, Chopin, Tchaikovsky, Mozart, Bach, Bizet, Schubert, and Brahms while waiting for trains in 18 of the subway stations of Rio de Janeiro. By this means, subway authorities hope "to calm passengers during intervals between trips," states the newspaper *O Globo*. When the repertoire was selected, "compositions were chosen that would soothe passengers yet not give the impression of a dance hall on the platforms." "Acceptance was better than expected," said Luiz Mário Miranda, marketing director of Rio de Janeiro's subway system.

Everyone's Responsibility

"Humans have destroyed more than 30 per cent of the natural world since 1970 with serious depletion of the forest, freshwater and marine systems on which life depends," states an article in the newspaper *The Guardian Weekly*. The article, based on a recent report by three concerned organizations, including the World Wide Fund for Nature (WWF), notes that although Western countries have traditionally been the highest consumers of natural resources, developing countries are now "depleting their natural resources at an alarming rate." An official for the WWF observes: "We knew it was bad, but until we did this report we did not realize how bad." While the report faults governments for their failure to halt the trend, it mentions that "every individual bears a responsibility for being careless with the world's resources," says the paper.

FROM OUR READERS

Youth Suicide I would like to thank you very much for the series of articles "What Hope for Today's Youths?" (September 8, 1998) I was moved to tears. I have tried to commit suicide several times. But I am happy that I did not succeed.

A. Z., Czech Republic

These were very understanding articles on a sensitive subject. I attempted to end my life earlier this year while I was clinically depressed. Thank you for this timely subject. It saved my life.

R. P., England

Sad to say, I have two classmates who have tried to commit suicide. One of them did so because when he considered his future, he could not see anything good—only difficulties that had to be overcome. This article was therefore practical, for it explained in a very clear and specific way how our future can have meaning.

R. D., Spain

Your article touched my heart. It was as if Jehovah were speaking to me as a loving Father. When I was a child, I suffered abuse from my father. I have felt worthless and have often thought about ending my life. But now, as your article suggested, I am cultivating a yearning for "the real life."—1 Timothy 6:19.

S. R., Brazil

Thanks, especially for the quotes from youths, many of which contained solutions to problems in just a few words.

W. H., Germany

Earning Money Thank you so much for taking the time to publish the informative article "Young People Ask . . . How Can I Earn Some Money?" (August 22, 1998) I was having difficulty finding employment. But I followed

your recommendations and found a job, at last!

S. D., Ghana

Sign Language After reading your article "A Language That You See!" (September 8, 1998), I had to write and thank you. Articles like this help us to understand others who do not have the same circumstances as we do. I have a friend who was born deaf, and I have wanted to learn sign language. But for one reason or another, I have never found time to do it. I am not going to postpone learning it any longer!

M. E., England

I want to thank you for the great effort you are making in supporting deaf ones. I delivered some copies of your article to government officials. Because it was so well written, they asked for more copies! I also showed it to a lady who was opposed to her deaf daughter's studying the Bible with Jehovah's Witnesses. After reading the article, she shed tears of joy. She now supports her daughter's efforts to attend Christian meetings and has even promised to pay for her transportation to a Christian convention!

E. R., Mexico

I just had to let you know how much I appreciated the article. I had the goal of learning American Sign Language and assisting in the local sign-language congregation of Jehovah's Witnesses. But I had become discouraged. The article gave me just the boost I need to reach my goal!

N. D., United States

It was fascinating to learn that the Deaf actually think in their signed language. As a hearing person, I will be more mindful of looking for ways to communicate with the Deaf in a positive way.

P. H., United States

HOW TO AVOID A GLOBAL TRAGEDY

THE UNITED NATIONS CALLS IT A "GLOBAL TRAGEDY"—AND RIGHTLY SO. WORLDWIDE, EVERY MINUTE A WOMAN DIES AS A CONSEQUENCE OF PREGNANCY AND CHILDBIRTH.

Most of these deaths occur in developing countries. While only 1 woman in 10,000 dies from pregnancy-related causes in Europe and 1 in 12,500 in the United States, the odds rise to 1 in 73 in Latin America, 1 in 54 in Asia, and an appalling 1 in 21 in Africa!

Since many of these 600,000 pregnancy-related deaths each year could have been prevented with the help of skilled birth attendants, the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO) are now stressing the training of women (and men) as professional midwives.

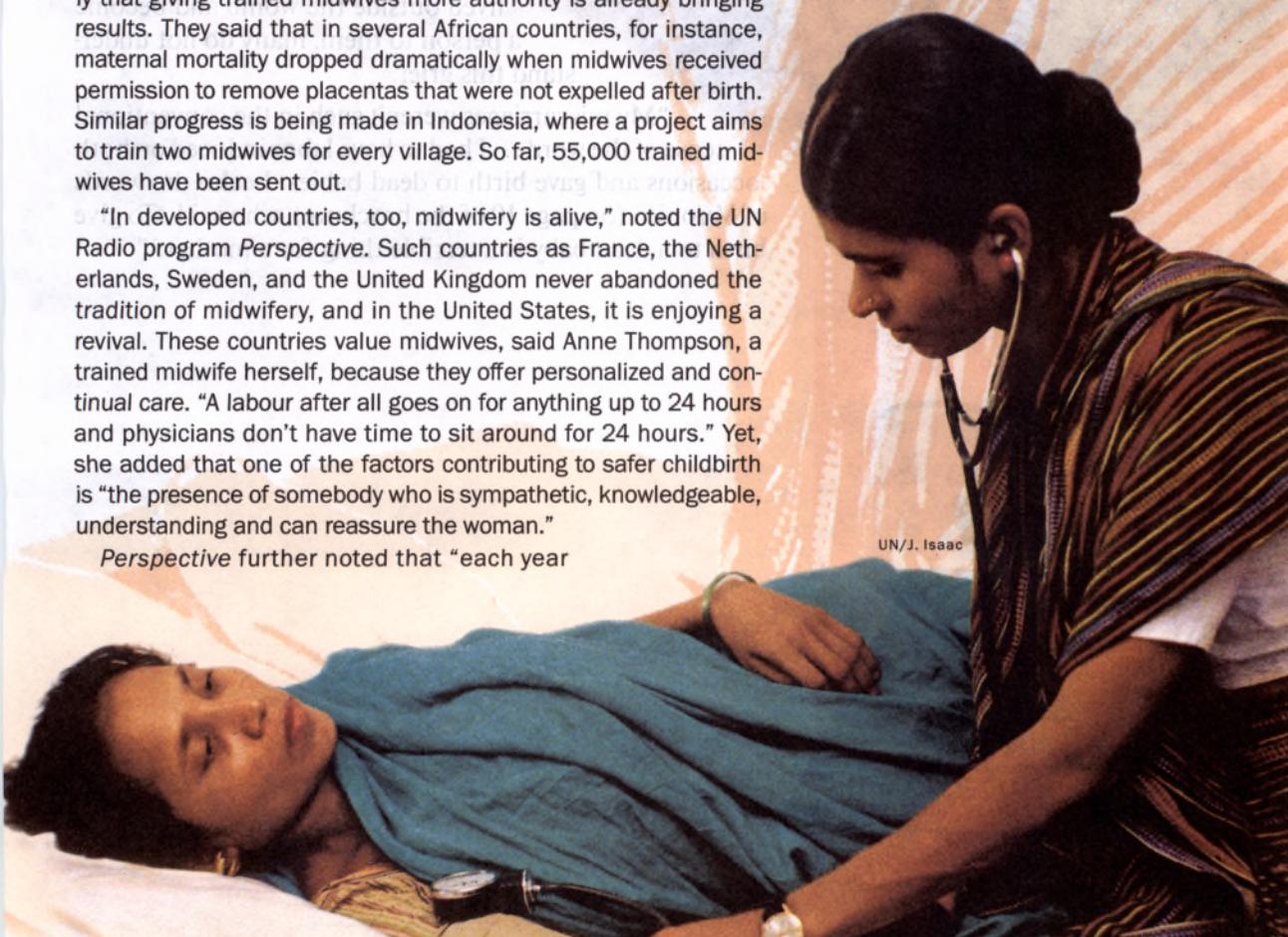
In countries where doctors are scarce, trained midwives can mean the difference between life and death. UNICEF's Dr. France Donnay and WHO adviser Anne Thompson told UN Radio recently that giving trained midwives more authority is already bringing results. They said that in several African countries, for instance, maternal mortality dropped dramatically when midwives received permission to remove placentas that were not expelled after birth. Similar progress is being made in Indonesia, where a project aims to train two midwives for every village. So far, 55,000 trained midwives have been sent out.

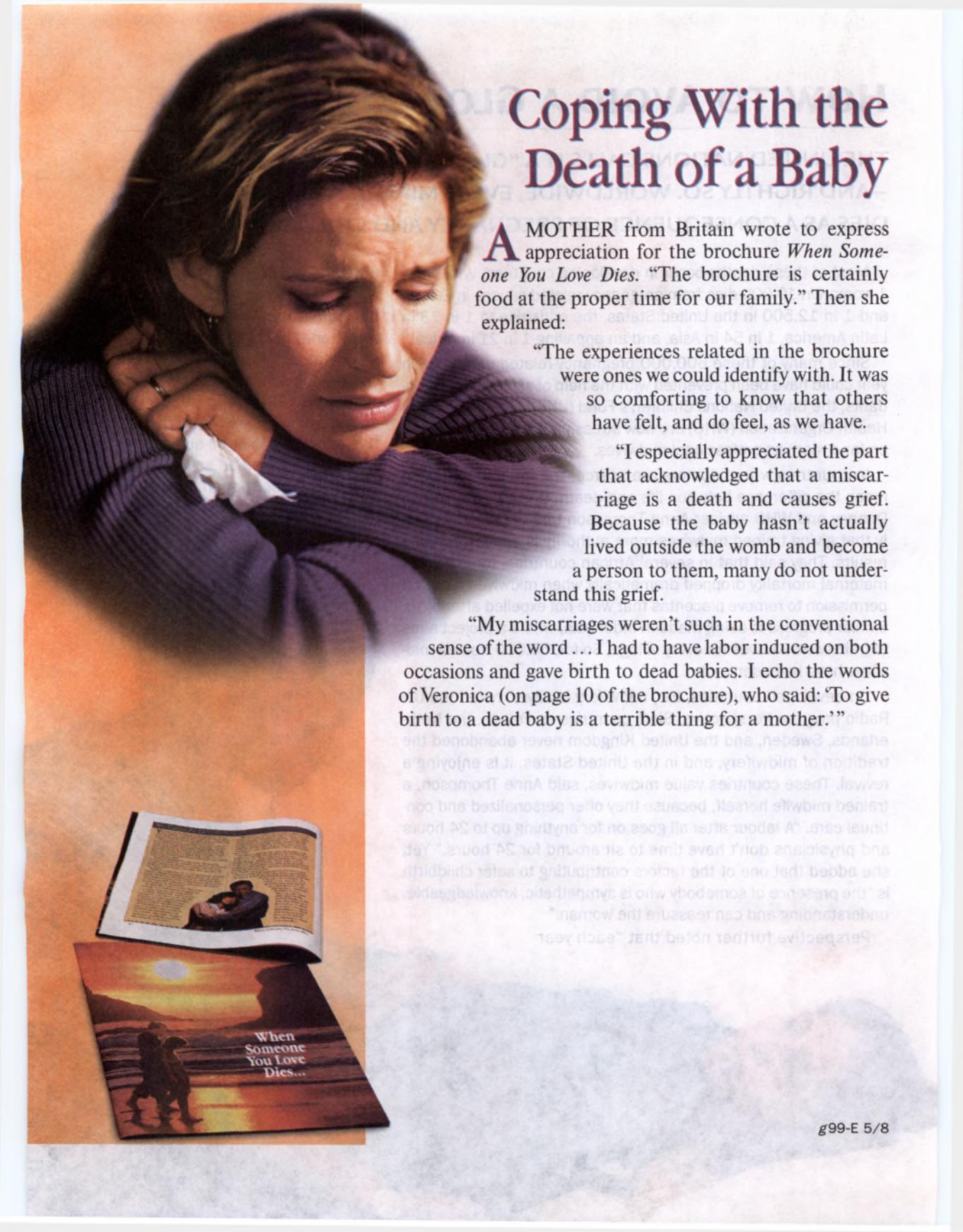
"In developed countries, too, midwifery is alive," noted the UN Radio program *Perspective*. Such countries as France, the Netherlands, Sweden, and the United Kingdom never abandoned the tradition of midwifery, and in the United States, it is enjoying a revival. These countries value midwives, said Anne Thompson, a trained midwife herself, because they offer personalized and continual care. "A labour after all goes on for anything up to 24 hours and physicians don't have time to sit around for 24 hours." Yet, she added that one of the factors contributing to safer childbirth is "the presence of somebody who is sympathetic, knowledgeable, understanding and can reassure the woman."

Perspective further noted that "each year

60 million deliveries take place in which the woman is cared for only by a family member, an untrained traditional birth attendant—or by no one at all." The UN is striving to change this. For starters, WHO focused the 1998 World Health Day on the theme "Safe Motherhood." "We know it will not be achieved in the next 2 or 3 years," said Dr. Donnay. Their goal, though, is to have "a professional attendant for each woman at delivery."

UN/J. Isaac





Coping With the Death of a Baby

A MOTHER from Britain wrote to express appreciation for the brochure *When Someone You Love Dies*. "The brochure is certainly food at the proper time for our family." Then she explained:

"The experiences related in the brochure were ones we could identify with. It was so comforting to know that others have felt, and do feel, as we have."

"I especially appreciated the part that acknowledged that a miscarriage is a death and causes grief. Because the baby hasn't actually lived outside the womb and become a person to them, many do not understand this grief."

"My miscarriages weren't such in the conventional sense of the word . . . I had to have labor induced on both occasions and gave birth to dead babies. I echo the words of Veronica (on page 10 of the brochure), who said: 'To give birth to a dead baby is a terrible thing for a mother.'"

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