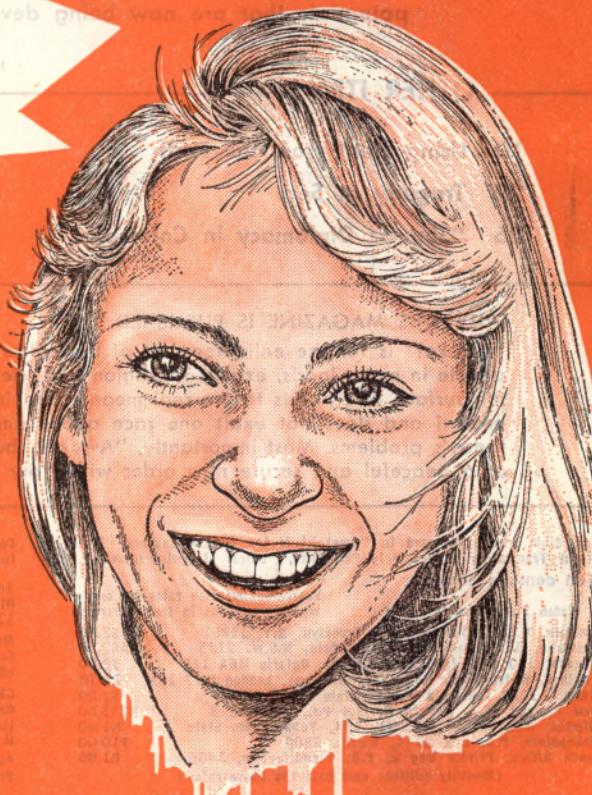


JANUARY 8, 1978

FEATURE ARTICLES

Awake!



**LIFE
WITHOUT
PAIN!**

IS IT REALLY POSSIBLE?

HOW SUBSTANTIATED IN 30 LANDMARKS

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FEATURE ARTICLES

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WHY THIS MAGAZINE IS PUBLISHED

"Awake!" is for the enlightenment of the entire family. 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 stays politically neutral and does not exalt one race above another. It also shows how to cope with today's problems. Most importantly, "Awake!" builds confidence in the Creator's promise of a peaceful and secure new order within our generation.

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A LIFE WITHOUT PAIN— IS IT REALLY POSSIBLE?

THE knuckles on the index finger of his right hand are badly swollen. "When I get up in the morning, my hands are terribly painful and stiff," explains this well-known South African surgeon. "I have had occasions now where during surgery it was just too painful to continue and I had to ask my assistants to take over."

Arthritic pain like this, and even worse, plagues millions. In the United States alone there are some 19 million arthritics. In addition, each day there are an estimated seven million Americans in bed with low back pain. And at any given moment, over 12 million persons in just the U.S. are said to suffer with a headache.

Millions of others have painful toothaches, earaches and hemorrhoids. There is also the excruciating pain many suffer from the effects of cancer, heart and circulatory diseases, and from a multitude of other sicknesses and injuries. An authority on pain, Dr. John J. Bonica, observes: "I consider chronic pain the foremost health-economic problem."

Each year Americans alone spend billions of dollars in the quest for relief. In the U.S., sufferers of back pain annually make over 18 million visits to doctors' offices. And those suffering headaches are estimated each year to take up more than 12 million hours of doctors' time. In the face of these stark realities, it may appear

rash even to suggest the possibility of enjoying a life without pain.

In fact, when viewed in this light, what the Bible says about pain may seem far-fetched: "[God] will wipe out every tear from their eyes . . . neither will mourning nor outcry nor pain be anymore."—Rev. 21:3, 4.

"That's impossible," you may say. "Everyone suffers pain. It's part of life." But is it? Did you know that even now there are people who never feel pain?

People Without Pain Today

A news report tells of a young girl: "On one occasion she was hiking in Switzerland. 'Why are you limping?' friends asked her.

"I hadn't noticed that I was," said Joyce, smiling. She had a dislocated hip." Yet this girl felt no pain. Nor had she ever felt pain in her whole life!—*The Star Weekly Magazine*, July 30, 1960.

Although this condition is rare, there really are people who live their lives without pain. The 1976 *Encyclopaedia Britannica* notes: "There are upward of 65 reports of persons who were born without the ability to feel pain at all, or else very little."

Would you like to be such a person? Would you desire to live your whole life without feeling pain? Many persons who daily suffer agonizing pain may, without

"There are upward of 65 reports of persons who were born without the ability to feel pain."

hesitation, answer, 'Yes.' But consider what that could mean.

If while hiking or playing you developed a blister, you probably would not notice it until it became a terribly ulcerated sore. Also, it would be dangerous for you to attend a barbecue, or be anywhere near a fire, for a spark could badly burn you before anyone noticed it. Being unable to feel pain can have serious, even disastrous consequences.

Yes, indeed, pain is an important warning signal of the body. It, in effect, forces you to take action to protect yourself. So, then, what about that grand-sounding Bible promise mentioned earlier, "*neither will . . . pain be anymore*"?

Are you inclined to say: 'We can do without the fulfillment of that promise; I'd rather be able to feel pain'? Such a reaction is understandable if you were to take the promise literally, in its restricted sense. But is that the way it was intended to be taken? Is it really proper to put such an absolute interpretation on it?

What the Promise Means

Look for a moment at the Bible's setting, or context. Note that, just before, it is promised that God "will wipe out *every tear from their eyes*." Now consider: Does this mean that God's purpose is to change the normal function of the eyes' tear ducts? Will he stop them up so that they no longer emit fluid? What would happen if this occurred?

Your tear ducts sprinkle tiny amounts of refreshing and cleansing dewlike moisture over the eyes throughout the day and night. This keeps your eyes moist and prevents friction between the eye and the lid. When your eyes are invaded by foreign substances, such as dust, smog and dirt, your tears wash these away. Importantly, too, tears contain an antiseptic substance called lysozyme, which disinfects the eyes and saves them from serious infection.

Thus it is seen that tears are vital to the health and protection of your eyes. So if God were to wipe every tear from people's eyes in a total sense, it would be a calamity. Obviously this is not what God has promised to do. What, then, does it mean that "he will wipe out every tear from their eyes"?

It is not the tears that normally bathe and protect the eyes that will be eliminated. Rather, it is tears of sorrow that God will wipe away. God did not originally purpose for humans to shed such tears. However, the first human pair rebelled against His rule, bringing sickness and trouble on the whole human family, and it is this that has resulted in tears of suffering and sorrow. Notice from the context of this scripture how relief will come.

Just prior to the promise about pain and tears being done away with, the Bible writer reports: "I saw a new heaven and a new earth; for the former heaven and the former earth had passed away." (Rev. 21:1) Note that relief is associated with the passing away of a former heaven and earth, and the replacing of them with "a new heaven and a new earth."

Of course, the Bible is not speaking about our literal heaven and earth passing away. The "former heaven" refers to the unrighteous rulers now in power, including the present unrighteous political gov-

ernments and the evil forces behind them. The "former earth" refers to today's ungodly human society. On the other hand, the "new heaven" will be a righteous new government—the kingdom of God for which Christians pray. (Matt. 6:9, 10) And the "new earth" will be a righteous society of people who are obedient subjects of God's kingdom.

THE PAINLESS LIFE YOU CAN ENJOY

PAIN is something of a paradox. It can constitute a dreaded affliction. Or it can serve as a real protection.

The sensation of pain causes us immediately to draw our hand away from an object that is so hot it would damage our flesh. This sensation of pain—this marvelous warning mechanism of the body—is not what the Bible is speaking about when it promises that "neither will . . . pain be anymore."—Rev. 21:4.

What the Bible refers to here is the nagging, chronic pain that makes daily life miserable for literally hundreds of millions of people and causes them to spend billions of dollars in the quest for relief. What a blessing it will be when never again does a person suffer with arthritis, a headache, an earache, a toothache, or is plagued by any other kind of sickness or injury! Yet how can that situation ever be realized?

So a life without pain will be enjoyed right here on earth when the former heaven and earth are removed and are replaced by a clean human society ruled by God's kingdom.

But what will it be like when 'pain is no more'? Will not people, at least on occasion, suffer severe pain that causes sorrow and crying?

"The wages of sin is death, but the gift of God is eternal life through Jesus Christ our Lord."—Rom. 6:23



The Changes Coming

First, as we saw in the previous article, there must be a radical change in the present system. And God promised that there will be! He purposes to change our "earth," completely removing all present kingdoms, or governments. He will accomplish this by means of his own government, as the Bible says: "The God of heaven will set up a kingdom that will never be brought to ruin. And the kingdom . . . will crush and put an end to all [the existing] kingdoms, and it itself will stand to times indefinite."—Dan. 2:44.

But how can a change of government rid our bodies of the pains that so often afflict them? It can do so because of the wisdom and power of the one that God has chosen to head his government, Jesus Christ. Of him, a Bible prophecy says: "The government shall be upon his shoulder. . . . Of the increase of his government and peace there shall be no end." (Isa. 9:6, 7, *Authorized Version*) A person with such authority can use his knowledge of the needs of the human body to prevent painful diseases.

An experience of the British fleet in the eighteenth century illustrates how this may come about. The dreaded 'scurvy infection' ravaged the seamen, killing thousands yearly. Their gums would swell and bleed, their teeth would become loose, soreness and stiffness would develop in their joints and lower extremities. But then it was discovered that something vital was missing from their diet—foods containing vitamin C. So when lemon juice, and later lime juice, was made part of the regulation diet of British seamen, no longer did they suffer and die of scurvy.

The story is similar regarding the painful, deadly disease beriberi. It was discovered some years ago that among people who depend largely on a rice diet, those who ate *polished* rice developed beriberi,

while those who ate *unrefined* rice did not. Thus the knowledge that rice hulls contain a vital substance, more recently identified as thiamine, made possible the control of painful, and often fatal, beriberi.

But the knowledge and wisdom of Jesus Christ, now resurrected in heaven, is far greater than that of any earthly physician. He *fully* understands the workings of our physical bodies, as he has proven. While he was a man on earth over 1,900 years ago he cured the worst of diseases and afflictions, thus demonstrating what he will do on a larger scale as ruler of God's kingdom. Of one instance, the Bible says:

"Then great crowds approached him, having along with them people that were lame, maimed, blind, dumb, and many otherwise, and they fairly threw them at his feet, and *he cured them*; so that the crowd felt amazement as they saw the dumb speaking and the lame walking and the blind seeing."—Matt. 15:30, 31.

What a marvelous change! And God's ruler Jesus Christ will eliminate, not just scurvy, beriberi and other afflictions that men, with their limited knowledge, have been able to control, but *all* human ills! This will be not in just one small area but earth wide! The Creator's promise is: "No resident will say: 'I am sick.'" (Isa. 33:24) Yes, then, under the rule of God's kingdom, will be fulfilled the promise, "*neither will . . . pain be anymore.*"—Rev. 21:4.

Some information about pain may help us to appreciate how, even when a person might ordinarily be expected to feel pain, the Great Physician, Jesus Christ, will see to it that it is not felt.

What Is Pain?

This seems to be a simple enough question, "What is pain?" But it is not. Dr. John J. Bonica, authority on anesthesia and pain, notes: "If you asked 100 differ-

"Clinicians still aren't sure what pain is."

ent authorities that question, you would get 100 different answers." But why?

Science News of October 26, 1974, explains: "Clinicians still aren't sure what pain is and how to treat it." More recently, Dr. Peter James Dyke, professor of Neurology at the Mayo Medical School, said: "We do not pretend to know how pain works."

Research has revealed pain to be much more complex than previously thought. Very illuminating were the studies made about 20 years ago of a woman who, during life, had no sensation of pain. The doctors at the University of Saskatchewan in Canada tried to find out the reason for this. "They looked for the nerve endings," explained *The Star Weekly Magazine*. "If Joyce didn't have any, that would account for the girl's insensitivity. But they were present and apparently perfect. "Next, the doctors examined the nerve fibers supposed to connect the nerve endings with the brain. Here, surely, a defect would be found. But it wasn't. The fibers were all perfect, as far as could be seen, aside from those degenerated due to injury.

"Finally, examinations were made of the girl's brain and, once more, no defect of any kind could be established. According to all existing knowledge and theory, this girl should have felt pain normally, yet she couldn't even feel tickling." She was, however, sensitive to pressure when applied to the skin, and could distinguish between the touch of a pin head and a pin point, although the pricking of the pin did not hurt.

Prior to these Saskatchewan studies, it was generally assumed that pain is a form of sensation like sight, hearing and touch. Pain, it was believed, is felt by special nerve endings in the skin, and is transmitted through particular nerve fibers to the brain. In this view the body has a sort of pain telephone system, with pain impulses traveling along a specific nerve pathway like a telephone line. But as seen from persons who seem to be normal in all other respects except in their ability to feel pain, the matter is much more complex. Other examples also illustrate the complexity of pain.

Some persons have had an arm or a leg amputated, but feel great pain as though it were in the missing limb. Also, there is what is called "referred pain"—persons have a malfunction in a certain organ, say the heart, yet feel pain in another body part, say the arm. Now, too, acupuncture has added new dimensions to the puzzle of pain.

Acupuncture is a medical procedure in which hair-thin needles are inserted into the body at certain well-defined points. It has become the preferred method of anesthesia in China. Utilizing acupuncture as the only pain-killer, major operations are performed on conscious patients.

The *Medical Tribune* reported: "Dr. White and Dr. Dimond, both cardiologists, watched open heart surgery in Peking with acupuncture anesthesia. They said that the patient was awake, alert, relaxed during surgery, and that the surgery was performed as well as any they had ever seen."

Explanations Offered

In an attempt to explain some of these mystifying aspects of pain, a "gate theory" has been offered. Opening and closing of a so-called "gate" in the spinal cord is said to either permit or block passage of pain signals to the brain. Thus, it is thought,

acupuncture may prevent pain, even in a fully conscious person undergoing open heart surgery, by triggering impulses that close the spinal-cord gate to block pain signals from reaching the brain. Although this is the leading new theory, its authors themselves admit that it cannot explain all the varied facts of pain.

Now new discoveries are providing further explanations. In the past couple of years scientists have found that our bodies produce their own pain-killing drugs, called enkephalins and endorphins. "It appears," explains Dr. Solomon Snyder of Johns Hopkins University, "that the human brain produces its own morphine."

It was in December 1975 that the discovery of the first natural analgesics was announced. These were isolated from pigs' brains, and called enkephalins. Then, early in 1976, the first of a number of related substances, named endorphins, were isolated. Beta-endorphin, the second endorphin discovered, was isolated from dried camel pituitary glands. It is, reportedly, "at least 20 to 40 times more effective than morphine in the relief of pain when injected directly into the brains of rats and mice."

No one yet knows the exact functions of enkaphalins and endorphins in dulling or blocking out pain. "The endorphins are probably not constantly secreted," says Dr. Avram Goldstein of Stanford University in California; "they are held in reserve for extreme situations" when the body needs relief from pain.

Bruce Pomeranz of Canada's University of Toronto believes that endorphins explain why acupuncture kills pain. He suggests that the needles stimulate nerves that cause body cells to release endorphins. The endorphins then go to work somehow to dull the nerves that are involved in the perception of pain.

These drugs, it is believed, may also answer the mystery of those people who do not have the ability to feel pain. "If

Our bodies produce their own pain-killing drugs.

their brains or bloodstreams contain higher levels of one or another of these chemicals," notes one researcher, "their insensitivity to pain would perhaps be explained."

Importance of Mind and Emotions

It is a fact, too, that one's emotions and frame of mind have a lot to do with perception of pain. Football players involved deeply in the game, or soldiers in the heat of battle, may be seriously injured and yet feel little or no pain at the time. Also, women who are trained to relax and remain calm during childbirth often bear their children with much less pain than anxious women who receive pain-killing drugs to relieve their agony.

Dr. John J. Bonica commented on people's different responses to pain: "The response is influenced by early learning, ethnic background, personality, susceptibility to suggestion, concentration, mood and other factors. Fear and anxiety cause an exaggerated response. . . . We think that anxiety causes the brain to send messages down to the spinal cord to open the gates so that, in fact, he feels more pain."

Thus, one may learn to sense pain. It evidently can be a conditioned reflex. Dr. Seymour Diamond, a headache expert at the Chicago Medical School, says, for example, that nine out of 10 headaches are due to emotions and other psychological factors and only 10 percent have an underlying organic cause. Noting the connection between pain and learning—or conditioning—Dr. Wilbert Fordyce, a professor of psychology who specializes in problems of pain, explains:

"The question is not whether the pain is real. Of course it is real. The question is what are the crucial factors which influence it. If I talk with you just before dinner about a ham sandwich, you salivate. It is very real. But it occurs because of conditioning. There's no ham sandwich there. Human beings are exquisitely sensitive to conditioning. It influences social behavior, salivating, blood pressure, the speed of digesting food, pain, all sorts of things."

Just as your emotions and frame of mind can intensify pain, so can they suppress or dull it, as already noted with ball players and soldiers hurt in the heat of a contest. Servants of Jehovah God, who calmly look to him with complete confidence and reliance in times of trial, also have had the experience of their pain being suppressed. A traveling overseer of Jehovah's Witnesses in a country where persecution of Christians was severe, wrote: "Regardless of the amount of insulting and beatings that we received, a few seconds would pass and we would not feel anything more even though the beatings continued."

Christ's apostles may have had a similar experience, the Bible explaining: "They summoned the apostles, flogged them, and ordered them to stop speaking upon the basis of Jesus' name, and let them go. These, therefore, went their way from before the Sanhedrin, rejoicing because they had been counted worthy to be dishonored in behalf of his name."—Acts 5:40, 41.

You Can Enjoy a Life Without Pain

Despite attempts to understand it, much about pain still remains a mystery. It is beyond the ability of humans to control. Things that men have learned about pain help us to appreciate that the Bible promise, "neither will . . . pain be anymore,"

is something that only God's Kingdom ruler, Jesus Christ, will fulfill. (Rev. 21:4) At the same time the body's marvelous warning mechanism that produces pain will not be banished. It will continue to function for mankind's good.

But how will Christ relieve his subjects of *all* unwanted pain? As noted earlier, it is God's will for Christ to lift them out of their sinfulness and to restore the obedient ones to perfect health. So a major factor in bringing relief from pain will be the healing of his subjects' minds, so that their emotions and mental attitudes are wholesome and proper. But the healing of their physical bodies will be important too. Under the Kingdom rule, the various body mechanisms involved in controlling pain—including the body's production of its own pain-killing drugs—will function properly. Thus pain will never cause suffering again!

You can enjoy life under God's Kingdom rule when the kind of pain that plagues millions of people no longer exists. Why, the promise is that even "death will be no more." (Rev. 21:4) But you cannot realize these blessings without effort; you need to do something. Jesus Christ pointed to a fundamental requirement that you must meet when he said in prayer to God: "This means everlasting life, their taking in knowledge of you, the only true God, and of the one whom you sent forth, Jesus Christ."—John 17:3.

Jehovah's Witnesses will be happy to assist you to acquire this vital knowledge. Just ask one of them locally, or write to the publishers of this magazine, expressing your wish to have a Bible study in your home or at any other convenient location. Arrangements will then be made for you to learn more about God's purposes for humans to enjoy a life without pain.

By "Awake!" correspondent in El Salvador

USING HEAT FROM THE EARTH



August 7, 1975, was a memorable day for a small Central American country with a population of a little more than four million and an area of just 21,000 square kilometers (8,100 square miles). A thermoelectric plant, using neither coal nor oil, started operating that day, freeing the country from the need to import fuel for generating electric power. What, then, operates the electric generators?

Steam lying very deep under the surface of the ground.

EL Salvador is a country of many volcanoes. Along nearly a longitudinal axis of the land, which also follows a line of geological faults in the earth's crust, there are 18 volcanoes. At least four of them have been active in the more recent past. Volcanic action also has manifested itself in the form of visible steam leaks, geysers or cavities in the earth (called *ausoles* in the native Indian language).

How is the steam produced? Scientists tell us that rainwater filters into the ground through craters and other highly permeable areas and finally reaches rock. Sometimes, especially in volcanic regions, rock heated by lava lies near enough to the surface of the earth so that the water is heated to temperatures high enough to convert it into steam. In Ahuachapán, in the western section of El Salvador, earth cavities in the form of mud ponds eight to 10 meters (26 to 33 feet) in diameter have existed for some time. These are full of boiling mud varying in color from reddish brown to yellow, and they give off vapors having a strong sulfurous odor. For many years these cavities were merely a

tourist attraction, no thought being given to the use of them for any practical purpose.

The Start of Geothermal Studies

In the 1950's, however, the CEL (Comisión Ejecutiva Hidroeléctrica del Río Lempa), an autonomous governmental body in charge of the development of hydroelectric power, heard about the first developments of endogenous (internally developed) power from the earth. This was in the Larderello region of Italy. Also, New Zealand was trying to generate electricity by using such resources at Wairakei.

This news created much interest. El Salvador was just starting the development of its hydroelectric energy from rivers. But to make the best use of such energy, it would eventually be necessary to generate thermal power. To do so with fossil fuel would require importing oil or coal. On the other hand, natural steam could be harnessed to accomplish the same thing.

The year 1953 saw the start of the first geothermal investigations in the Ahuacha-

pán area. In 1958, 11 shallow exploratory wells were dug in the fields of Playón de Ahuachapán and El Salitre. More serious geological, geophysical and geochemical research began in 1966, covering an area of 200 square kilometers (77 square miles).

The investigations gave promise of excellent potential for energy sources. Therefore, in 1968, experimental wells were dug to depths of 865, 981 and 1,192 meters (2,838, 3,218 and 3,911 feet) respectively. One of these wells was dry, but the other two began producing steam at temperatures of 231 degrees and 208 degrees Celsius (448 degrees and 406 degrees Fahrenheit) respectively, and at pressures of 10 kilograms per square centimeter (142 pounds per square inch). These wells were kept at full steam production for more than one year to test their capacity for maintaining stable pressures and temperatures. In January 1970, six more wells, varying between 700 and 1,400 meters (2,300 and 4,600 feet), were dug in the fields of Playón in Ahuachapán to obtain data for technical and economic feasibility studies, with a view to creating the first 30-megawatt geothermal plant. This plant was intended as the first-stage development for utilizing to the full the estimated capacity (100 megawatts) of the geothermal Ahuachapán field.

A Program for Nonfuel Power Plants

Construction of the first power-generating plant, with a capacity of 30 megawatts, started in 1974. This plant was inaugurated and put into service in August of 1975. A second 30-megawatt generating unit began to be built in 1975. This required boring five additional wells to depths between 600 and 850 meters (1,970 and 2,790 feet). The second unit was put into service in 1976. A third generating unit, with 35-megawatt capac-

ity, is now under construction and will utilize the steam from the first two units. Thus, the geothermal field in Ahuachapán will be generating 95 megawatts of continuous power starting this year. Because of not having to use fossil fuels, this represents savings of 28.5 million colones (\$11.4 million) annually for the country.

The good results obtained until now have prompted a vigorous program of exploration and research in the eastern part of the country. New wells are being opened in that area to implement the expansion program for geothermal power.

Environmental Pollution

Electric-power generating plants using fossil fuels, like coal or oil, or employing atomic fuels, give rise to pollution problems. Ashes, smoke and gases may contaminate the atmosphere. Lakes and streams may be polluted from the discharge of water used for cooling. Also, the final disposition of residual products from these plants presents a serious problem to the community.

On the other hand, geothermal plants, burning no fuel at all, could be expected to offer fewer environmental pollution problems. Nevertheless, the steam, gases and water produced by geothermal wells can bring about ecological difficulties.

In the case of geothermal fields producing dry or superheated steam, there are natural discharges containing high concentrations of sulfates, some acidity and traces of chloride. Some of these waters may be slightly alkaline, with a predominance of sulfates and bicarbonates. There may also be a high concentration of carbon dioxide, boron and ammonia. Another element, hydrogen sulfide, is highly toxic and could cause ecological problems.

Fields producing water steam yield

large volumes of residual water. This water usually has a high salt content that is harmful to plant and creature life. The boron content always exceeds what has been established as tolerable by resistant crops. Arsenic is generally associated with these waters, too, making them unfit for human consumption.

So, the final disposal of these residual waters presents serious problems. Principally, the following disposal methods have been employed: (1) Dilution into the sea, (2) dilution into rivers, (3) reinjection into the subsoil and (4) evaporation in ponds.

Dilution into the sea could be expensive and difficult if the geothermal field is far away from the seashore. Dilution into rivers depends on the amount of water flowing, so that tolerable concentrations of toxic elements are not exceeded. During the dry season, rivers often have so little water that this would be impossible. Re-injection into the subsoil strata could be obstructed by the salts carried in the residual water, as these salts form deposits on the walls of wells. Evaporation in ponds is possible only if large areas of flat land are available to construct the ponds and if the rainfall is minimal in the region.

At the Ahuachapán geothermal plant, residual water passes through an open canal, to be diluted in the sea. Also, there

have been successful experiments with re-injection into the soil.

Economic Aspects

It is interesting to compare the costs of a geothermal power plant with those of conventional plants, either hydroelectric or thermal plants powered by fossil fuel. Investment costs for the Ahuachapán 95-megawatt geothermal power plant have been estimated at \$700 for installed kilowatt. The generating cost for this plant is \$0.005 for each kilowatt hour generated, whereas the cost for the biggest hydroelectric plant in El Salvador, Cerrón Grande, is \$0.004 per kilowatt hour. However, the cost of generating power in oil-fired plants presently runs \$0.024 per kilowatt hour. This is almost five times as much as the cost for geothermal plants. No wonder El Salvador is eager to develop its endogenous power!

Now that the energy crisis is increasing in the world, many countries are looking for new sources of power to substitute for the scarcer and more expensive imported oil. Endogenous power—heat from the deep layers of earth's crust—certainly is a useful source of energy. It may, therefore, be expected that other countries having cavities in the earth that emit smoke, or where there are some other signs of volcanic activity, will start to tap these hidden treasures under their feet.

What Is It Like Down There?

WHILE men have walked on the moon, we know little about the depths of our earth. The "ground" we tread on is but a "stony skin," or crust, about 20 miles (32 kilometers) thick. Below this are: the mantle, the outer core and the inner core. Man has never made it all the way through the crust, for which we should be thankful.

The heat within the earth grows progressively intense; at the center it may be as high as 9,000 degrees Fahrenheit (5,000 degrees Celsius). While the outer core is said to be "liquid metal," scientists think that the inner core of iron and nickel is solid, apparently because of the extreme pressure.

SCHOOL FATIGUE—

By "Awake!" Correspondent
in Sweden



what can
be done
about it?

"AS SOON as I touch the handle of the locker, I get tired. After the first lesson, I just go home. Everything is boring. I want to work and make money or, at least, do something meaningful." This is what a 14-year-old girl in Sweden said to a child psychiatrist when explaining why she had begun to cut classes so often.

Obviously the girl suffered from school fatigue, an "ailment" that is spreading among pupils in modern society. School authorities, teachers and parents often feel powerless when faced with it. In fact, in many places the problem of school fatigue is so great that it has become a subject of extensive research.

An Underlying Reason Often students suffering from fatigue find the subjects in school boring and meaningless. There is also frustration that

comes from having to study too many subjects. Because of disorder in the classroom, some students are insecure and nervous. Still others have problems with fellow pupils. Children from families with differing religious beliefs may frequently find themselves in conflict. Factors such as the foregoing contribute to school fatigue. However, many surveys point to one basic underlying cause—pupils experiencing school fatigue (lack) motivation for studying. They simply find it pointless. For many years they attend school without getting any practical benefit from much of the material taken up in class.

Why is school fatigue more common among teen-agers than among younger students? Researchers say that younger children want to learn because of natural curiosity. They are motivated by a desire to imitate what adults do. Usually they

find almost everything exciting in school, and are more willing to fit in. After puberty, though, other motivations are needed. Alvar Ellegård, a professor and researcher of learning technique at the University of Gothenburg, Sweden, says concerning this: "After puberty it is no longer possible to play in knowledge or a feeling of fitting in. We must then, instead, give schoolwork a goal and a purpose in order to get the pupils to accomplish something." Research also has revealed that learning is more automatic before puberty because of an inborn need to learn for life. After puberty, however, knowledge is acquired in a more constructive and systematic way and, therefore, requires more concrete motivation.

What Can Be Done?

Many fatigued pupils can be helped by being given incentive. Who can aid them with this? A summary of research undertaken by the National Swedish Board of Education says of such students: "Those who have interrupted their studies and played truant in comprehensive school, those who have persistently desired to leave comprehensive school early, and those who have finally interrupted their studies at secondary school level come from homes of low socio-economic status and homes where parents have not provided the necessary support in connection with schoolwork." (Italics ours.)

Two American researchers, W. R. Morrow and R. C. Wilson, who have studied the family relationships of 96 high school boys, both "bright high achieving and underachieving," found that good family life made a difference. Better results were attained by those having a more harmonious and emotionally supportive homelife. These researchers, therefore, maintain that the atmosphere in the home affects school-

work and associated activities. They also found that children who had received a negative attitude toward school from their parents were often negative in adapting to school.

What Parents Can Do

So, parents can do much to foster their children's interest in schoolwork. How? They should be interested in it themselves. This is not just a matter of asking now and then: "What happened at school today?" Rather, parents should manifest interest in more specific things—details regarding schoolwork. Then, they should discuss matters in terms that reveal an understanding of what their children are studying.

It is also important that parents show that they expect something from their sons and daughters at school. It is good for children to have *reasonable* demands put upon them. At heart, they do appreciate this. Otherwise they may reason: "Why exert myself when nobody cares about the result?" In this connection, Professor Alvar Ellegård noted: "It is unnatural for people above childhood not to have demands on them. Lack of demands does not make life happier."

Hence, parents ought to tell their children what is expected and then follow through accordingly. They can praise and reward success, and provide comfort and help in case of failure. This gives children a wholesome feeling of importance and assures them that somebody really cares.

Parents might also stress the usefulness of education. They could explain how they themselves have benefited from learning a certain subject at school. Also, they might point out to their children which problems and situations in adult life require certain skill or knowledge.

Parents should take a sincere interest in their children's schoolwork

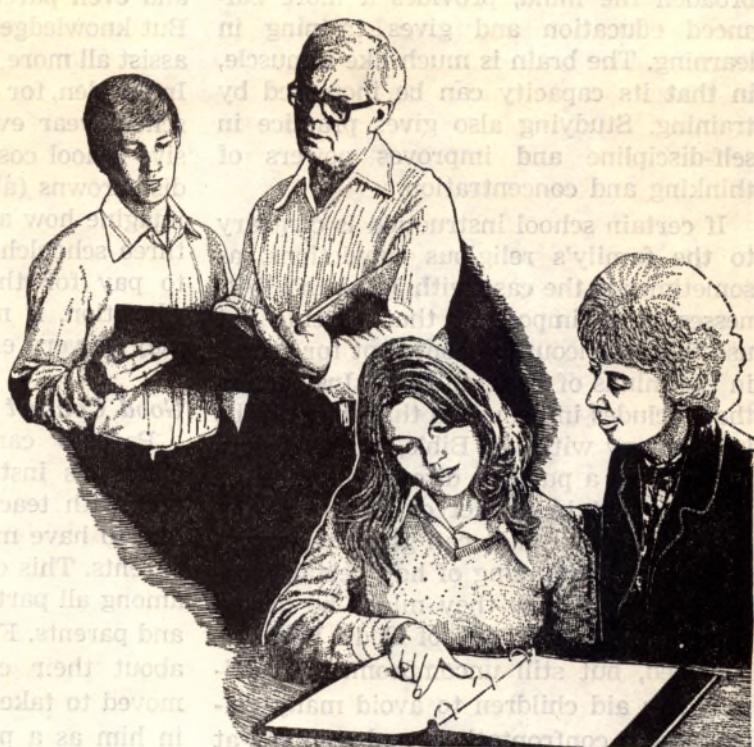
Putting School Information to Practical Use

Another way to motivate children to study is to arrange situations in which they can put their newly gained knowledge to practical use in everyday life. Many educators have discovered the importance of practical application of schoolwork. Efforts have been made to combine theory with actual work. Students are periodically sent out to places of employment to put acquired knowledge to use. Similarly, parents can give their sons and daughters different tasks and responsibilities.

When it comes to some foreign language, why not arrange for the children to use it as much as possible? Perhaps you could take them to places where the language is spoken, ask them to translate clippings or quotations in that language, or invite to your home friends who speak the language.

For practical application of mathematics, children could be encouraged to keep a personal account book, to total receipts in the household, to calculate the costs of certain repairs at home, and so forth.

For reading exercise, parents could have



their children read aloud to them. Some youngsters have gained much happiness and practical experience by reading to blind persons and others unable to read for themselves. One father has his daughter regularly read study material for him on recording tape. Then, when going to and from work, he listens to it in the car on his cassette recorder.

Many parents have found it good to let their children do manual work and thus get used to handling tools. Such practical application of knowledge contributes toward the development of the mind.

Appreciating Education's True Value

Even if certain subjects taught in school do not seem necessary for the future, children can be made aware of their value. Knowledge of various fields serves to

broaden the mind, provides a more balanced education and gives training in learning. The brain is much like a muscle, in that its capacity can be increased by training. Studying also gives practice in self-discipline and improves powers of thinking and concentration.

If certain school instruction is contrary to the family's religious convictions, as sometimes is the case with Jehovah's Witnesses, it is important that parents not use this to encourage contempt for school in the minds of their children. Instruction that includes information that may not be in harmony with the Bible, but that does not require a pupil to disown his faith or to take part in an act of false worship, can still be useful. It can give the youngster an understanding of how certain people think and how they might be helped to appreciate the value of God's Word. A balanced, but still uncompromising, attitude can aid children to avoid many embarrassing confrontations and conflicts at school. Instead of being argumentative when such subjects are dealt with in class, children should be taught that much more can be gained by being tactful, polite and cheerful.

In many countries school education now is free. This may cause young people—

and even parents—to minimize its value. But knowledge of how expensive it is may assist all more fully to appreciate its value. In Sweden, for example, during the 1976/77 school year every student in comprehensive school cost the taxpayer 12,300 Swedish crowns (about \$3,000). One can easily imagine how an average family man with three schoolchildren would feel if he had to pay for their education. Hence, free education, if missed when we are young, may be very expensive to get in later life.

Good Contact with Teachers

Parents can show interest in their children's instruction through good contact with teachers. Many teachers would like to have more of an interchange with parents. This creates better understanding among all parties involved—teacher, pupil and parents. Feeling that the parents care about their child, the teacher may be moved to take a greater personal interest in him as a pupil. The student may also be more inclined to behave well and show proper respect for the teacher.

Life at school nowadays may be very trying for many pupils. That is why they need love and a sense of security. A school nurse with 30 years of experience says: "The lack of security in some children is frightening. Something basic is missing. I know for certain what is needed: love and interest. You can pour love over a child. He soaks it up like a sponge."

So, very often insecurity and a feeling of meaninglessness are responsible for school fatigue. Therefore, parents can do much in dealing with this problem by striving to provide their children with incentive for study. This they can do by taking an active interest in their children's schoolwork and giving them a sense of security, making them feel loved and appreciated.

In Future Issues

■ The World's Hungry Millions —Can They Be Fed?

■ I Fly on the Concorde

■ The Miracle of Bird Flight

MAGNETISM —powerful servant of man

MAGNETISM—what would life in this modern age be like without it? Why, it brings us the electricity that warms our homes, lights our roadways, cooks our foods, and does many

chores for us daily! We could not enjoy fine music on a radio, watch a television program, or even pick up a telephone and call a friend, if it were not for magnetism.

Associated with this extraordinary force is something the Chinese called "The Stone That Licks Up Iron." Sailors gave it the name *lodestone*, meaning "the stone that leads." We call it a magnet, a name derived from the ore *magnetite*, which was plentiful in Magnesia, a district in Asia Minor. Regardless of the name, however, the mysterious power within the lodestone made it as precious as gold. Kings were fascinated by it. Sailors would navigate the oceans by means of a small sliver of it. Pagans thought that the gods sent the stone to guide them. But in spite of all the attention given to it, no one in the ancient world could have foreseen the tremendous potential of the force we call magnetism.

Today it is easy to obtain a magnet. Although the ore magnetite is not commonly available, man-made magnets of great power can be purchased for a small price. Many a child has amused itself for hours playing with a couple of small magnets. For that matter, magnets are so plentiful today that they often go unnoticed.

But just what is magnetism? How does it affect us? What is the source of its mysterious power? Let's take a closer look at this powerful servant of man.

Characteristics of Magnetism

A few experiments with two bar-shaped magnets will help us to see some fundamentals of magnetism. Lay a piece of paper over the first magnet and sprinkle some iron filings (such as those from a nail) onto the paper. Tapping the paper a few times with your finger will cause these filings to form a strange pattern. Notice that all the small pieces of iron assemble themselves in lines that seem to loop out of one end of the magnet and into the other. Here we are observing just a small part of the *magnetic field*. These invisible lines of magnetic force actually surround the magnet completely, in all directions. The areas on each end of the magnet where all these lines converge are called the *poles*. Every magnet has two poles that cannot be separated from each other. If we were to cut our bar magnet in half, the result would not be two half-magnets, each possessing one pole. Rather, we would have two complete magnets, each having two poles, as did the original magnet.

Now that we have traced the magnetic field and identified the two poles of the magnet, let's observe another very interesting property of magnetism. Tie a string around the middle of the magnet and suspend it in the air. You will notice that one end of the magnet will swing around until it points to the north. Move it away and it will always swing back to the north.

The pole of the magnet that points to the north is called the *north-seeking* pole, and the one that points to the south, the *south-seeking* pole. This property of magnetism is the basis for the compass. But what causes this phenomenon?

To find out, we will need to use the second magnet. On each magnet let's mark the pole pointing north with an *N*, and the one pointing south with an *S*. Now take one magnet in each hand and move the *N* of one magnet near the *S* of the other. What happens? There seems to be an invisible force that pulls them together. But reverse the position of one of the magnets, putting the *N*'s or the *S*'s together, and the force now seems to push them apart. This demonstrates an unchangeable law of magnetism, namely, *opposite poles always attract, whereas like poles always repel.*

This is why one end of a magnet always swings to the north. The earth itself has a magnetic field, just as the bar magnet does. This field extends far out into space and converges at each of the earth's poles. So, a magnet's north-seeking pole will always be attracted by the North Pole of "magnet earth," while being repelled by the South Pole.

Probably the most familiar characteristic of magnetism is its ability to attract metals. Not all metals are drawn to a magnet, however. Brass, aluminum, gold and silver are not attracted to a magnet, whereas iron, steel, nickel, cobalt, chromium and other metals are attracted, though in varying degrees. Interestingly, the attractive power of a magnet is the same at both of its poles. Hence, an iron nail, for example, will be attracted just as strongly by either end of our bar magnet.

Our look at these basic characteristics of magnetism leaves us with very important questions yet to be answered. What is the source of this power? Yes, just what

causes magnetism? And why are not all metals magnetic?

Finding the Cause of Magnetism

To answer the foregoing questions, we will have to examine the basic building block of matter, the atom. It consists of a tightly packed nucleus made up of protons and neutrons, with varying numbers of electrons circling around it, much as the planets of our solar system orbit the sun. This movement of electrons actually results in a minute magnetic force within the atom. Most electrons are paired in such a way that their magnetic fields cancel each other. When all the electrons in an atom are paired, the net magnetic field is zero. Metals composed of such kind of atoms are nonmagnetic.

But if the atom has unpaired electrons, it has a net *magnetic moment*, as the scientists call it. The strength of this magnetic moment determines how the atoms line up in the solid metal. In most metals, the agitation of the atoms at ordinary temperatures is great enough to overcome the magnetic forces, and the atomic magnets are disarranged, in random directions. The net resultant of the magnetic fields of a large number of atoms averages out to zero.

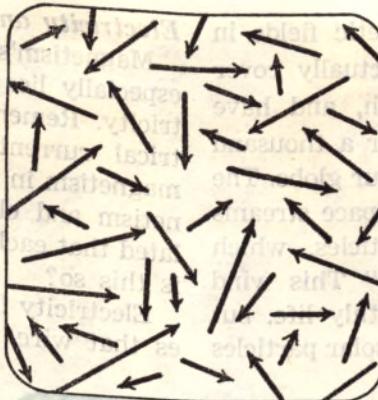
However, magnetism can be induced in such metals when they are placed in another magnetic field. Chromium is such a metal. The force of the magnetic field causes the atoms to turn into a parallel alignment. But as soon as it is removed from the field, thermal agitation again prevails, and this destroys the alignment. The chromium loses its magnetism. Metals like this, which do not retain magnetism, are called *paramagnetic*.

By contrast, in some metals, including iron, cobalt, and nickel, the individual atoms have much stronger magnetic moments. They are so strong that when atoms are crystallizing out of a melt, one atom

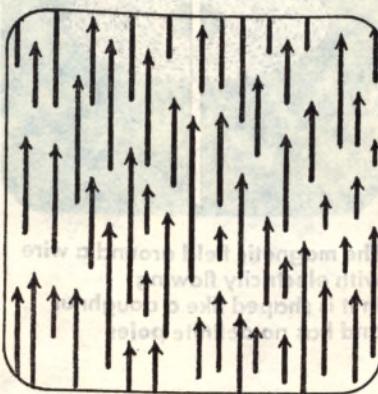
feels the influence of its neighbor, and clusters of atoms align themselves with their magnetic axes parallel. Each such group actually becomes a small magnet. However, these clusters are microscopic in size and they are randomly oriented in a fresh casting. Thus an ordinary iron nail, for example, is not a magnet.

But if a piece of iron is placed in a magnetic field, the groups that happen to be in line with the field tend to grow at the expense of neighboring groups, by pulling adjacent atoms into line with them. This action is enhanced if the metal is heated, or stressed as by drawing. The alignment formed in this way persists when the iron is removed from the field. Thus the metal has become a permanent magnet. Such metals, which can be permanently magnetized, are called *ferromagnetic*. The iron atoms in magnetite were so aligned, apparently by the earth's magnetic field when the ore was crystallizing.

The larger the groups are that are aligned with the field, and the smaller the ones that are randomly oriented, the more powerful will be the resultant permanent magnet. Scientists have learned that by applying heat or stress on the metal while it is within a powerful magnetic field, the maximum number of atomic groupings can be permanently aligned. In this way, per-



In nonmagnetized metals, small atomic groups are arranged with their magnetic poles situated at random



When magnetized, atomic groups realign themselves so that they lie parallel to one another

manent magnets of great strength can be produced economically.

Celestial Magnetism

As mentioned earlier, the earth itself is one large magnet. What causes this globe's magnetic field? Some have thought that it was caused by the naturally magnetic ores within the earth. In other words, they have considered the earth to be a giant permanent magnet. But in more recent times it has been learned that the very high interior temperature of the earth rules out that possibility.

Today the most commonly accepted explanation is that our globe's magnetic field results from electric currents in the earth's core, in some way related to the revolution of the earth on its axis. There is evidence also that other planets are magnetic. Jupiter, in particular, has a field much stronger than the earth's.

And the sun itself has an extremely powerful magnetic field. Even the Milky Way, the galaxy that includes our sun and some hundred billion other stars, gives evidence of having a magnetic field.

The role of the earth's magnetic field in protecting life is just being brought to light by scientists. An example of this can be seen in connection with the violent magnetic storms on the surface of our sun (known as "sunspots"). The gigantic re-

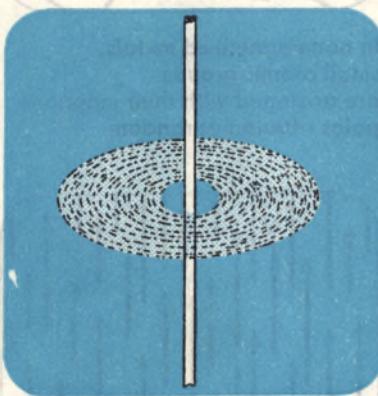
gions of concentrated magnetic fields in the hot solar atmosphere actually cover areas larger than the earth, and have magnetic fields that are over a thousand times stronger than that of our globe. The sun continually sprays into space streams of electrically charged particles, which are called the "solar wind." This wind would be devastating to earthly life, but our magnetic field traps the solar particles out in space before they even reach the atmosphere. It bends their paths into spirals around the lines of magnetic force and funnels them into the atmosphere in the north and south polar regions. Even so, when there is a severe magnetic storm on the sun, we can expect shortly afterward a geomagnetic storm that disrupts radio transmission, radar, and even power distribution. It also produces the grand 'fireworks displays' that are called the *aurora borealis* and *aurora australis*, the "northern lights" and "southern lights."

The earth's magnetic field also helps to protect us from the most damaging cosmic rays by diverting them to the polar latitudes. We probably do not yet fully realize in how many ways this magnetic "cushion" serves to our benefit. But it is becoming evident that the magnetism of our planet plays a key role in protecting life.

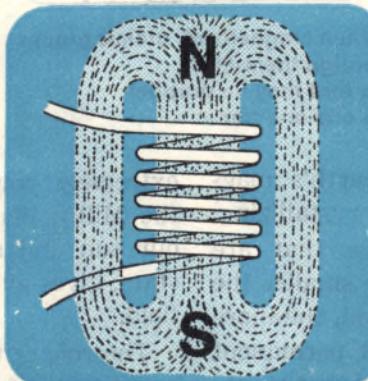
Electricity and Magnetism

Magnetism's ability to serve mankind especially lies in its relationship to electricity. Remember that the minute electrical current within the atom causes magnetism in the first place. In fact, magnetism and electricity are so closely related that each one causes the other. How is this so?

Electricity flowing through a wire causes that wire to become magnetized. No, the wire will not attract other metals because the magnetic field surrounds the wire in a circular pattern, having no definite poles. But if the wire is coiled like thread on a spool, the magnetic field around each coil amplifies that of its neighbor, resulting in one large magnetic field. The more numerous the loops or coils of wire, the stronger the magnet produced. This magnet can be turned on and off simply by turning on and off the electricity flowing through it. If there is no electrical current, there is no magnetic field. This type of magnet is called an *electromagnet*.



The magnetic field around a wire with electricity flowing in it is shaped like a doughnut and has no definite poles



When the wire is coiled, electrical current within it will produce an electromagnet with definite magnetic poles

magnet releases the metal, and as it springs back to its original position, it strikes another chime, resulting in the familiar "ding-dong." In this, and sometimes in more complex ways, magnets and electromagnets are at the heart of most electrical appliances.

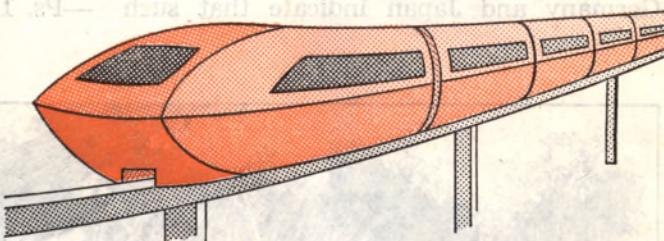
Electric motors are based on the electromagnet. To state it simply, electromagnets arranged in a circle are turned on and off at precisely timed intervals, and the attractive/repulsive properties of the magnets set an armature spinning within the circle. Thus electric motors of varying strengths do many chores for us, from turning the hands on our clocks to speeding heavy commuter trains to their destinations.

Switches, relays, solenoids, meters, gauges, and so many other instruments of the electrical industry are based on this simple relationship between electricity and magnetism. Why, magnetism permits the sound of your voice to be transmitted over telephone wires to your loved ones, and then allows you to hear their voices in reply! Electromagnets within the speakers of your radio, television or stereo set convert electrical impulses into sound, reproducing the original with amazing fidelity. Yes, magnetism allows you to make a tape recording of your son's first words, or your daughter's first violin solo, and to relive those precious moments years later.

It is a beam of electrons focused precisely by magnetic fields that produces the picture on your television set. This same focusing of electron beams by magnetism allows scientists to peer into the world of the infinitesimally small by means of electron microscopes.

Electricity's relationship to magnetism works in a converse way as well. The generators that produce electricity depend on magnetism. Powerful permanent magnets are arranged in a circle, and turbines driven by steam or water cause coils of wire to rotate through these powerful magnetic fields. This movement of the wire causes an electrical current to flow in the wire. Then this current is transformed to a suitable voltage and passed on to our homes.

It would not be an overstatement to say that the entire electrical industry would not exist today if it were not for that powerful servant of man that we call magnetism.



High-speed trains that "fly" above special tracks by means of "magnetic levitation" are being developed

Great Potential

There are many things yet to be learned about magnetism, and the more scientists learn about this power, the more uses they find for it. For example, a new technology called *magnetohydrodynamics* (MHD) promises to make the generating of electricity even more economical than it is today. Most major cities now use steam turbines to run their generators, and fossil fuels such as coal are burned to produce the steam. By means of MHD, though, it would be possible to produce electricity, not only in the generator, but also in the smokestack. How? Well, when the hot gases resulting from burning coal are channeled through a magnetic field, an

electric current is produced. This revolutionary new system can convert the energy from coal into electricity, doing so with greater efficiency than any other system makes possible. Some researchers say that the increase in electricity produced from a ton of coal by means of MHD is as much as 50 percent. MHD also has been proposed as a method of extracting power from certain types of atomic reactors.

In the field of transportation, progress is being made in developing trains that "fly" above special tracks by means of "magnetic levitation." Electromagnets placed on the train and in the track bed cause the train to float about a foot above the guideways, and then to be propelled forward at remarkable speeds. Tests in Germany and Japan indicate that such

trains will move passengers at speeds of up to 190 miles (306 kilometers) per hour. High-speed transportation systems based on magnetic levitation have both economic and environmental advantages over other systems. For example, there are no moving parts to wear out, smaller amounts of energy are consumed, and they are non-polluting and silent in operation.

Man is just beginning to 'scratch the surface' in his quest for more uses of magnetism. Increased knowledge of such dynamic power within our universe may well cause us to reflect on the might of Jehovah God, the Creator of such forces. He is 'abundant in dynamic energy and vigorous in power,' and has originated magnetism—that powerful servant of man!

—Ps. 147:5; Isa. 40:26.



TRAGEDY AT SEA

WE SET off from Gasmata, New Britain, around 11 o'clock on Wednesday, March 9. The weather was delightful. A gentle breeze billowed the sail of our outrigger canoe and steadily moved us along. For added speed, we paddled.

As related to "Awake!" correspondent in Papua New Guinea

On our left, the coast was fringed with dark-green mangroves for a good part of the journey. These were intermittently broken by coastal villages and small beaches every so often along the way. Waves lapped at their white sands, and lines of

coconut palms served as their backdrop.

Some three to five miles (5 to 8 kilometers) farther inland, the jungle-clad mountains in this part of the 300-mile-(485-kilometer-) long island, New Britain, rose abruptly to as high as 5,000 feet (1,525 meters). How majestic they looked!

Now and then, our canoe passed over colorful beds of coral where tropical fish could be seen. We were moving along fairly close to the coast. Here the sea was calm. From time to time, we caught sight of small reefs farther out to sea, these being marked by rippling white lines—the breakers rising and casting off their load of foam at quick intervals. Our sitting in the canoe and surveying all this peacefulness and grandeur caused a deep sense of satisfaction to well up within us observers. Truly, a beautiful setting!

Little did we know that in a few hours' time this serene sight would change. We would find ourselves in a boiling sea with huge waves being whipped up by a cyclonic wind!

Purpose of the Trip

The purpose of the trip was to attend an assembly of Jehovah's Witnesses about 30 miles (50 kilometers) up the coast at Umisa. We were five in all, two full-time ministers in special service, Jack Nelulu and William Nahilo, an elderly man named Deia, his wife Kurkur and their six-year-old adopted daughter. Some of Jehovah's Witnesses in the small congregation at Umisa were looking after Deia's 12-year-old daughter and 10-year-old son. So Deia and Kurkur had an added reason for going—to see the other two children again.

Trips like this are common among us coastal dwellers of New Britain. We were not doing anything out of the ordinary by sailing an outrigger canoe up the coast. All our people travel in this manner. And what a spectacle the canoes are with their

white sails fully extended as they skip across the waves! Our area abounds with fish and other sea life. As we sailed along, it was fascinating to see the various types of marine life. The antics of the porpoises as they followed the canoes provided comedy and variety for us.

Struck by a Terrific Wind

Late in the afternoon, we came to the end of the reef along which we had been sailing parallel. Ahead of us, not far from the main island of New Britain, we could see a small island called Atui. We decided that we would make the crossing. Only a light wind was blowing.

Suddenly, at about six o'clock, when we were about halfway across this stretch of open sea, still a mile (1.6 kilometers) away from Atui, we were struck by a terrific wind. Quickly it churned up the sea. Water started pouring into the canoe and we made frantic efforts to bail it out. Could the mast and sail withstand the lashing wind? If they did, we knew that we would make it to safety on the small island. But this was not to be.

The wind was too strong. It blew with great force down from the mountains. Under the pressure, the mast broke, leaving us at the mercy of the wind. We paddled harder. Oh, how we pulled on those paddles! But we were powerless to direct the course of the canoe toward Atui. We were blown seaward, out past the island. Even then we thought that if the canoe stayed together we would be able to find our way back again after the wind abated.

Farther and farther out we were driven. The sea grew rougher. Now the question was, Would the canoe stay together? Stresses on every beam grew greater. Then, around seven o'clock, our canoe broke up, it being unable to withstand the pounding anymore. It split from bow to

stern, the wind blowing the lighter half away. Quickly we realized that it was hopeless trying to salvage anything from the canoe, although William still hung on to his bag.

Without losing a moment, Jack ripped the remainder of the canoe apart, throwing planks to William, Deia and his wife, while yelling frantically: "Now we can swim. Whoever reaches the shore first can tell our brothers in the congregation what has happened and they can come and find us."

One Reaches Safety

William was then separated from the others and could no longer be seen in the dark. He began to swim toward Atui Island, hoping his bearings were right. In the meantime, Deia, Kurkur and Jack, with the little girl clinging to his shoulders, decided that it might be better to swim for the reef, hoping that they could stand on it until help came.

"As I swam I thought of Jehovah God and I wasn't afraid," William said later. He did not feel any cramp in his arms and legs and he did not think of drowning. On and on he swam, but still no land. Then, he recalls: "About nine o'clock the moon came up. I could see the lights of Fullerborn [a plantation] and its island, and I swam toward it. I reached the island about 11 o'clock. By then my body was numb and I couldn't feel anything." William just lay there on the beach until he felt stronger and his vision returned to normal. The sea and the wind had blurred his eyes so that he could not see properly.

When he felt his strength return, he got up and took his bag, which he had hung onto all the time he was in the water. He walked to a village on the island. When he reached it, only a few people were in their houses. (The rest, afraid of the

strong winds, had paddled to a larger village on nearby New Britain.) The people took William in and gave him dry clothes and biscuits. Then he slept. At dawn, they took him over to the larger village on the big island. There he got a canoe and paddled to Umisa. He told his friends there what had happened, how the wind had destroyed the canoe and how Jack, the couple and the young girl had not yet reached shore. He feared that they were lost.

All were very sad. William told them that Jack did not have a plank like the rest of them. He was also carrying the little girl on his back. They concluded that he must have drowned, not having anything to help him. They thought the married couple must also be dead. All were very upset. But they comforted one another with the thought that if these were indeed dead, Jehovah would remember them and resurrect them.—John 6:40.

The Second Survivor Arrives

Throughout Thursday, some of the Witnesses there for the assembly searched for bodies in both directions along the beach. Others stayed and talked about what had happened. Then about 7:30 that evening, Jack arrived! He could hear some crying as he approached one of the houses. "Don't cry—I'm here," he said, after which he collapsed into sleep. Feeling that he needed food, they mashed some papaya and forced some of it into his mouth. At dawn on Friday, William and another person went to a nearby plantation where there was a two-way radio. Ships were alerted to search for the bodies of the other three. However, the sea was still too rough and captains were afraid to go out.

Jack Relates His Nightmare

Later, Jack awoke and related all that befell him. After losing sight of William,

he, Deia and Deia's wife called out to one another. They thought the canoe had broken up somewhere near the reef, so they tried to reach it. Deia and his wife both had planks from the canoe. As for Jack, he recalls: 'I did not have anything to hold for flotation. I just swam, with the girl clinging to my shoulders.'

The waves were mountainous and were rushing toward them very fiercely. Up and down they bobbed in the foaming water. The wind added to the nightmare as it drove stinging saltwater spray into their faces and eyes. As waves suddenly came upon them, they could not help but gulp down some of the seawater.

Soon Jack was separated from Deia and his wife. As it was dark, they could not see one another. "I shouted out their names," he said, "but they didn't answer." He then realized that he was not going to find the reef. So, with the child still holding on, he turned around and tried to swim toward the island that they had seen earlier. On and on he swam. About 10 o'clock the wind became exceedingly strong and the waves washed over them. Jack swam on for what seemed like a further 30 minutes, and when he felt for the young child, she was no longer there! One of the huge waves must have washed her off, and because his back was numb, he did not feel it.

Jack goes on: "When I realized that she was no longer on my back, I tried to find her." For about 30 minutes he searched, but to no avail. So on and on he swam, not knowing where he was going. He just kept swimming until sunrise. Nearby was Atui Island. It was about eight o'clock when he staggered up the beach and collapsed in exhaustion. Unknown to William, this took place on the opposite side of the island.

Jack had been in the water for something like 13 hours, much of that time

with the little girl on his back. Truly a marathon effort! How thankful he was to be alive! His still body lay on the shore all that morning. From time to time he would vomit up some of the seawater that he had swallowed. By midday he felt very weak. All he could do was lie there. He then fell asleep until about six o'clock that evening.

When he got up, he walked farther along the beach and found a small canoe. Normally a person could enjoy a walk there. Atui is not a very big island—only about 300 yards (275 meters) long and about half that wide, but it is very pretty, having a white-sand border all the way around it. Coconut and many other trees grow there in abundance, adding to its beauty. Nevertheless, this cyclonic wind had really battered this tiny island. Some say that these were some of the worst winds that they had ever experienced.

After finding the canoe, Jack slowly paddled across to where his friends were, about two miles' distance. Little wonder that he collapsed again upon arrival!

All Was Not Lost

Jack and William have since recovered from their ordeal. A court sat to hear what happened and the judge decided it was an accident. Nevertheless, feelings among relatives of the dead reached a high point. On this island, as in other parts of Papua New Guinea, there is what is known as the "payback" custom. Some have threatened the lives of these two full-time ministers, although it had been beyond their power to save the other three.

This means that it is not safe at the present time for anyone to preach the good news of the Kingdom in the area of Gas-mata where Deia came from, particularly in his village, Lukuklukuk. Sadly, people of other religions have tried to use this incident to stop the work of Jehovah's

Witnesses. But Jack and William feel sure that those interested in the Bible here still want to hear its truths. It is hoped that, in due time, the way will be opened for these villages to be visited again.

Jehovah's Witnesses recognize the truth of the Bible words concerning humankind: "Time and unforeseen occurrence befall them all." (Eccl. 9:11) This accident could have involved any person who happened to be on the sea when the storm broke.

William, understanding this, pointed out that those in the canoe knew that similar things happened to the apostles. Paul was shipwrecked four times. Once he spent a whole night and a day in the deep. (Acts 27:39-44; 2 Cor. 11:25) So, when this accident occurred, all of them thought of the apostles, and this strengthened them. Jack and William thanked God that they survived. Yet they were very sad about what happened to Deia and Kurkur and their little girl.

If you are a relative of Deia, a person from his area or perhaps just someone interested in this account, rest assured that all is not lost. The death of the three was

certainly a blow. No human can bring back the dead, as is shown in the case of King David's son. (2 Sam. 12:23) But as Jack said: "We know that Jehovah God will resurrect the dead." (Acts 24:15) He knows they are only sleeping in death and that God will remember them and awaken them from their sleep.—John 11:11-13.

May all relatives of these dear ones, Deia and Kurkur and daughter, along with all others who have experienced similar losses, draw comfort from the words of the apostle John at Revelation 20:13. There he describes what he saw take place in his vision of the resurrection: "And the sea gave up those dead in it, and death and Hades gave up those dead in them." Think what that means! Their death at sea does not create any difficulty for the Almighty. In place of the despair that comes in times of tragedy or loss, the promises of the Scriptures fill us with the confident expectation that reunion with loved ones can be our lot if we exercise faith in God's provision for salvation. This is the kind of reunion Jack and William await as they think of their dear friends lost in this tragedy at sea.

"Sound" Diplomacy in Colombia

THE management of the Covered Coliseum in Bogotá, Colombia, rented their auditorium out for a special program of Mexican "mariachi" music during a District Assembly of Jehovah's Witnesses being held there. The Witnesses stepped aside for this event, leaving a few people on hand to protect their sound equipment.

But a capacity crowd of over 16,000 Colombians began to protest when the costly sound system that had been contracted for failed to produce good sound. And when the crowd began throwing things onto the main floor from the tiers, the building administrator

feared that they might tear up the place, so he approached the Witnesses to see if their sound equipment could be used. As they started testing it, the audience began to applaud. After a successful program, the TV announcer suggested that the crowd express appreciation to Jehovah's Witnesses for their cooperation, which they heartily did.

A musician who until then had opposed his wife's association with Jehovah's Witnesses was so impressed that he confessed that he had had a wrong concept of them. In fact, he attended the assembly when it continued the following day at the Coliseum.



Why Not Smoke?

SMOKING, after all, is not a

sin." So wrote one person in a letter to a noted United States newspaper. Doubtless, this comment reflects the attitude of most people, especially those who use tobacco. They are likely to ask, 'Why not smoke? After all, it is not a sin.' Yet others may feel that it is wrong to smoke. Who is right? What does the Bible indicate?

Compatible with

Human Attributes?

One of the principal attributes with which the Creator has endowed man is wisdom. But is it wise to smoke? Well, the third report on smoking issued by Britain's Royal College of Physicians was entitled "Smoking or Health," instead of "Smoking and Health," as had previously been the case. Alluding to the report, the journal *New Scientist* stated: "The evidence that cigarette smoking causes lung cancer, heart disease, emphysema, and bronchitis is overwhelming." So, how wise is it to smoke and thus imperil one's health?

Another God-given human quality is justice. But is an expectant smoking mother dealing justly with her unborn child? Not really, for the Medical Department of Japan's

Tohoku University has reported that smoking women give birth to babies weighing an average of 200 grams (7 ounces) less than those of nonsmokers.

Love is another quality given by Jehovah God to humankind. But is it loving to smoke? Evidence gleaned from a five-year study by researchers of the London School of Hygiene and Tropical Medicine has indicated that the offspring of smoking parents had pneumonia or bronchitis during their initial year of life twice as frequently as did the children of nonsmoking parents. So it is not an act of love when family members smoke.

Still another attribute with which God has endowed humans is power. Smoking decreases willpower, for the use of tobacco becomes addictive. Accordingly, Dr. Robert Dupont, director of the United States National Institute of Drug Abuse, called tobacco "probably the most deadly drug in our society," and remarked: "People who use cigarettes have the same problem as heroin users. Both groups have a problem of control from morning to night 365 days a year."

Contrary to Bible Principles

By imperiling or ruining their health, smokers show a lack of wisdom, whereas the Bible encourages the acquisition and exercise of that quality. (Prov. 4:7-9; 7:4) Moreover, a wise person acts in a way that benefits him. Thus an inspired proverb says: "If you have become wise, you have become wise in your own behalf." —Prov. 9:12.

Also, whereas it really is unjust to injure the health of others by smoking, the Scriptures demand just acts on the part of those desiring God's approval.—Mic. 6:8.

By befouling the air, smokers do not show love for their families and others. Yet, love of neigh-

bor is a Christian requirement. Jesus Christ said: " 'You must love Jehovah your God with your whole heart and with your whole soul and with your whole mind.' This is the greatest and first commandment. The second, like it, is this, 'You must love your neighbor as yourself.' " (Matt. 22:37-39) Loving one's neighbor also calls for practicing the Golden Rule enunciated by Jesus: "All things, therefore, that you want men to do to you, you also must likewise do to them." (Matt. 7:12) Certainly, if a person was doing something in your presence that was obnoxious or sickening, you would consider it loving if he desisted.

Love of God also is involved. In what way? Well, those who have dedicated their lives to Jehovah God are to love Him with their whole heart, mind and soul, as Jesus indicated. Obviously, such persons would not want to endanger and possibly ruin their health by smoking and thus try to present to God something made inferior by their deliberate action. That would be contrary to the apostle Paul's counsel that Christians present their bodies "a sacrifice living, holy, acceptable to God." (Rom. 12:1) Moreover, since this sacrifice is to be "holy," true followers of Christ heed Paul's admonition: "Let us cleanse ourselves of every defilement of flesh and spirit, perfecting holiness in God's fear." (2 Cor. 7:1) That leaves no room for such an unclean habit as smoking, does it?

Also, please consider the matter of power over one's own will. If this were diminished by addiction to the drug nicotine found in tobacco, how could one please Jehovah God? His Word urges the cultivation and display of self-control, a fruit of God's spirit. (Gal. 5:22, 23; 2 Pet. 1:5, 6) Can it be said that godly self-control really is being exercised by persons who yield to nicotine addiction?

Consider a further point. Nicotine addiction affects the mind detrimentally and

produces enslavement. Hence, it may be classed with addictive drugs, such as those that provided the source for the Greek term *phar-ma-ki'a*, initially meaning "drug-gery." Due to the close connection between drug use and spiritism, this Greek word came to be associated with spiritistic practices. In fact, it was used by Bible writers and has been rendered "practice of spiritism" and "spiritistic practices" in passages that clearly condemn spiritism. (Gal. 5:20, 21; Rev. 9:20, 21) Therefore, persons who have not broken their addiction to tobacco do not qualify for baptism in symbol of an acceptable dedication to God.

Further Causes for Concern

For these many reasons, Jehovah's Christian witnesses shun tobacco. It would not be proper for any smoker to present himself as representing one of their congregations in declaring the "good news." Why not? Because spiritual and physical cleanliness are required of those who are, in effect, "carrying the utensils of Jehovah."

—Isa. 52:11; Ex. 30:17-21; Lev. 22:2-8.

Smoking in secret would not be fitting for one desiring divine approval either, for that would be devious. Such a person would be sinning, not only by smoking, but by hiding that fact from associates in the Christian congregation. Appropriately, we are told in Scripture: "The devious person is a detestable thing to Jehovah, but His intimacy is with the upright ones."

—Prov. 3:32.

Through earnest prayer and reliance on Jehovah God, hundreds of thousands of persons have overcome deeply entrenched bad habits and practices. (1 Cor. 6:9-11) Many have learned why they should not smoke. Then, with the aid of God's spirit, they have had the self-control and strength needed to overcome this unclean custom that stands in the way of faithful service to Jehovah and life in his new order.—Luke 11:13; Phil. 4:13.

Watching the World



Aliens, Please Note

◆ During January all aliens in the United States (with few exceptions) are required to report their addresses to the government. Forms for this purpose are available at offices of the Immigration and Naturalization Service as well as all post offices. Upon completing Form 1-53, place a postage stamp on the card's reverse side and mail it to the pre-printed address appearing there. Last year, in New York State alone, 4,964,331 aliens reported their addresses.

Top Salaries

◆ During the first half of the 1970's, Denmark became the world leader in salaries, according to a recent Conference Board report. The survey was based on the salaries of new engineers because job content is comparable in all nations and their wages frequently are used as a bench mark for salaries in other lines of work. In 1975, Denmark's beginning engineers had an average salary of \$20,400, compared with \$14,890 in the United States. Denmark, Federal Republic of Germany, Switzerland, Norway and Belgium all were ahead of the U.S.

Widowed Senior Citizens

◆ According to the American Council of Life Insurance,

women 65 years of age or older number 12.7 million in the United States. Of these, 53 percent are widows.

Cocaine Dangers

◆ It is thought that about two million Americans are using cocaine. Many persons consider this drug harmless, and it does have medical uses that seem beneficial. However, the journal *Scientific American* cites the results of a four-year research project financed by the National Institute on Drug Abuse, and comments: "Heavy, prolonged use of the drug can produce dependence, intense anxiety or depression and sometimes a cocaine psychosis characterized by tactile hallucinations, in particular a feeling that insects are crawling over the skin. Overdoses can cause death, resulting from a central-nervous-system response usually involving seizures followed by respiratory or cardiac arrest."

Penalty for Promiscuity

◆ Research at the University of the Philippines public health institute reveals that nearly all gonorrhea germs afflicting Manila patients are resistant to penicillin and other antibiotics except the drug named rifampicin. But fear is expressed that, within three years, it will be ineffective. The Philippine newspaper *Bulletin*

Today opened its report on this matter with the words: "For the promiscuous, a word of caution." But Bible students already know that the price paid for continued promiscuity is high indeed, for such persons "will not inherit God's kingdom."—1 Cor. 6:9, 10.

Watch Your Child!

◆ Crossing a street and bicycle riding are the greatest perils for children. But how many are injured or killed in a single year? Note some of the most recent sample statistics for youngsters under 15 years of age. By country, those injured ran as follows: Italy, 15,641; France, 19,090; Great Britain, 41,082; Federal Republic of Germany, 45,701; United States, 82,150. The death toll for the same age group was: Italy, 552; France, 552; Great Britain, 594; Federal Republic of Germany, 1,231; United States, 2,650.

Safeguarding Your Bicycle

◆ The U.S. Federal Bureau of Investigation recommends the following measures to foil bicycle thieves: Register the bike, with either the police or some other agency; etch on the frame your state's abbreviation, followed by the number of your driver's license; use a chain (through both wheels and the frame) and a good lock to secure an unattended bike to a tree or sturdy rack; also, do not leave your bicycle in an unlocked garage or on your porch or lawn, particularly during the night.

When Tremors Strike

◆ For over a year, speculation has grown that a great earthquake will strike Japan on the Pacific side in the area between Tokyo and Mt. Fuji. So, for some months, police and fire departments have conducted exercises to acquaint people with what they should do in the event of a quake. But has all the effort been worth while? Not if one judges

by the response to four tremors that jolted Tokyo and vicinity in the early morning hours of October 5. When the Tokyo Fire Department polled 1,005 persons by telephone, it found that 963 felt the tremor at 12:39 a.m., 42 slept right through it, and in only 35 out of 51 places where individuals were using fires did they extinguish them. Just 214 persons opened their doors in preparation for flight, whereas 614 of those surveyed took no defensive measures at all.

Divorce Rise in Britain
◆ Among the British, marital breakups have reached the point of nearly one divorce for two new marriages, according to Sir George Baker, president of the family division of Britain's high court. Recently, he said that in England and Wales during 1976 there were 146,415 divorces, as compared with 356,000 marriages. Baker indicated that wives sought the divorce in seven out of 10 cases.

Newfound Tribe
◆ In an undisclosed area of the Amazon, scientists have discovered an Indian tribe that runs a profitable gold mine described as "an underground city worked by 50 prisoners." The newly found Niawa tribe "also owns valuable jewels, marries off its children at age 6 and boasts a language with a 15-letter alphabet," reports *Parade* magazine.

Fatal Sound Shocks
◆ Professor of medicine Masaki Omori of Okayama, Japan, has found that mice are affected and may even be killed by supersonic waves. By accident, he noted that the 35-to 50-kilohertz vibrations produced by equipment used in the washing of test tubes caused mice in nearby cages suddenly to begin running around. These mice, of two separate breeds, died soon afterward. Dr. Omori thinks

that these breeds apparently possess genes that cause them to be sensitive to sound shocks, and he feels that sound-wave energy is absorbed through their hair and is transmitted by nerves to the animals' nervous systems, resulting in the death-dealing shock. But Dr. Omori considers it too early to tell whether his findings will have any application to humans.

Balloons Are Back

◆ Hot-air ballooning is rapidly increasing in popularity. In 1963 there were only six of them in the United States, but today there are about 1,000. These balloons, some 70 feet (21 meters) in height, are inflated with air that is heated by fuel such as propane gas. The warm air inside the balloon causes it to rise in the cooler air surrounding it. The balloon's burner can heat the air again in flight when more lift is desired. While the up-and-down motion can be controlled, there is no control of direction. The balloons are entirely at the mercy of air currents, resulting in a number of accidents. Most balloonists prefer to fly at altitudes of less than 500 feet (150 meters), because at low altitudes they can observe all the activity below and hear the sounds of birds, mountain streams, the wind in the trees, and people talking on the ground.

Smoking Increases Miscarriages

◆ A new study by Columbia University scientists in New York confirms that cigarette smoking during pregnancy nearly doubles the chance of a miscarriage (or, spontaneous abortion, as some call it). Previous studies showed that smoking caused a higher rate of infant mortality and lower-than-normal weight at birth, which causes a higher risk of serious illness. Also significant in the new study was the fact that light smokers suffered

nearly the same number of miscarriages as did heavy smokers. The striking difference in miscarriage rates was between smokers and non-smokers.

More Unmarried Couples

◆ The United States Census Bureau reports a huge rise in the number of unmarried persons living together. Nearly one million couples now do so, an 83-percent increase in such households in the last seven years. The Bureau also noted that the nation's marriage rate has dropped sharply in recent years.

Noise Levels

◆ Long exposure to noise levels of about 70 decibels can cause hearing loss. Typical levels for some sounds are: jet airplane takeoff, 120; garbage truck loading, 100; city traffic, 90; alarm clock, 80; electric shaver, 75; noisy restaurant, 70; air-conditioning unit, 60; light auto traffic, 40; quiet office, 40. The sound level doubles with each 10 decibels.

Endangered Creatures

◆ Citing information provided by the International Union for Conservation of Nature and Natural Resources, the journal *To the Point International* lists the following as the most threatened animals in Africa: Northern square-lipped white rhino, Jentink's duiker (an antelope), Swayne's hartebeest, Grevy's zebra, Cape Mountain zebra, mountain gorilla, cheetah, black rhino, Barbary macaque (a monkey) and the leopard.

Stronger Finnish Hearts

◆ For some time North Karelia County in eastern Finland held the distinction of having more people die of heart disease, on the average, than any other place on earth. But after a special five-year prevention program, the heart-attack rate for males reportedly has dropped by 40 percent. Though

Finland still has the highest heart-disease rate among developed nations, North Karelia is down to fifth place among the nation's counties. The improvement is credited to a co-ordinated program that attacked smoking and fat in the diet, while promoting consumption of fresh vegetables.

Mechanizing Religion

• In their legalistic quest for godliness, devout Jews seeking rulings on fine points of conduct have had a big job. It has meant searching the *Responsa*, 2,500 volumes of rabbinical opinions compiled over 1,200 years. Now, though, for just \$50, a powerful computer near Tel Aviv will quickly come up with references to answer such questions as, "What dietary standards must a kosher hotelkeeper maintain for gentile guests?" In a test, the computer was able to produce

far more references needed for full answers than did a panel of Talmudic scholars.

• Reform Judaism recently issued a new book of prayers to replace their previous 25-year-old prayer book. The new book covers more situations in life, enabling pious Jews to read off a prayer for everything from adopting a child to entering college.

Substitute for Whale Oil

◆ Oil from the sperm whale has been an important component in lubricating oils. But since this whale is an endangered species, importation of its oil into the United States is forbidden. However, years of research with the jojoba, an oil-bearing bean, is now bearing results. The peanut-sized jojoba contains an odorless, chemically rare liquid wax that is almost identical to sperm-

whale oil. The bean grows in arid desert regions of Mexico and the United States. Hundreds of acres are now under commercial cultivation, and wild jojoba plants are being harvested too. Its oil also is used in some cosmetics. It is nontoxic and nonirritating. And since it is chemically stable, it will not turn rancid as do some other oils.

Falls Still Receding

◆ Famous Niagara Falls between Canada and the United States has been eroding for many years. A number of suggestions have been offered to slow down or stop the erosion, but an International Joint Commission has rejected them all as impractical. Instead, it has decided to "let nature take its course." Presently the falls are receding at the rate of about one meter a year.

