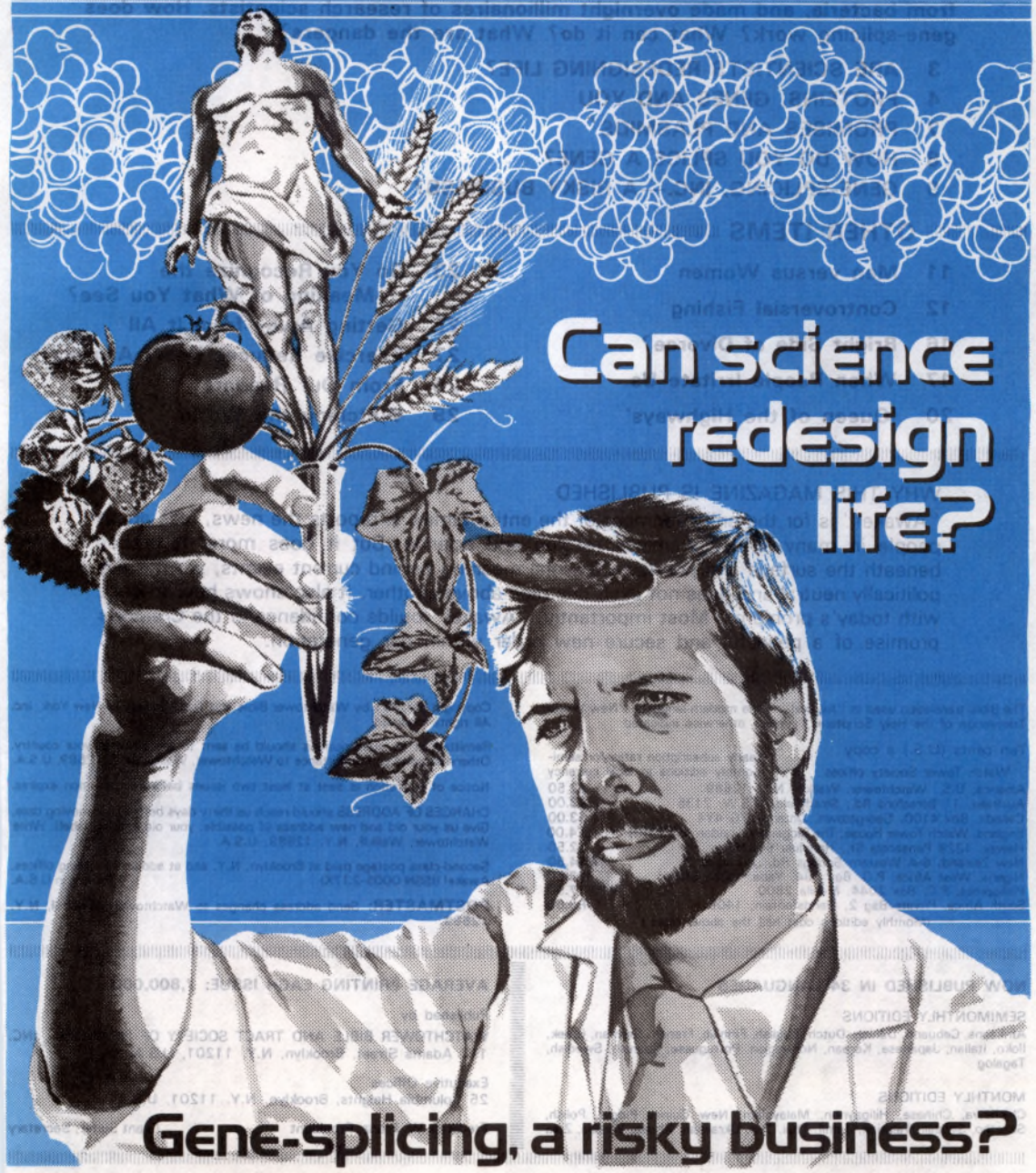
Awake!

AUGUST 22, 1981



Can science redesign life?

Gene-splicing, a risky business?

Awake!®

August 22, 1981
Vol. 62, Num. 16

FEATURE ARTICLES

"We are on the verge of a revolution in the chemical basis of medicine," says Nobel Prize-winning biochemist Arthur Kornburg. What is causing the revolution? Gene-splicing, a new technology that has already produced insulin and interferon from bacteria, and made overnight millionaires of research scientists. How does gene-splicing work? What can it do? What are the dangers?

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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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Ten cents (U.S.) a copy

Watch Tower Society offices	Yearly subscription rates for semi-monthly editions in local currency
America, U.S., Watchtower, Wallkill, N.Y. 12589	$2.50
Australia, 11 Beresford Rd., Strathfield, N.S.W. 2135	$3.00
Canada, Box 4100, Georgetown, Ontario L7G 4Y4	$3.00
England, Watch Tower House, The Ridgeway, London NW7 1RN	£4.00
Hawaii, 1228 Pensacola St., Honolulu 96814	$2.50
New Zealand, 6-A Western Springs Rd., Auckland 3	NZ$4.50
Nigeria, West Africa, P.O. Box 194, Yaba, Lagos State	₦2.50
Philippines, P.O. Box 2044, Manila 2800	₱17.50
South Africa, Private Bag 2, Elandsfontein, 1406	R3,60

(Monthly editions cost half the above rates.)

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Remittances for subscriptions should be sent to the office in your country. Otherwise send your remittance to Watchtower, Wallkill, N.Y. 12589, U.S.A.

Notice of expiration is sent at least two issues before subscription expires.

CHANGES OF ADDRESS should reach us thirty days before your moving date. Give us your old and new address (if possible, your old address label). Write Watchtower, Wallkill, N.Y. 12589, U.S.A.

Second-class postage paid at Brooklyn, N.Y. and at additional mailing offices.
Awake! (ISSN 0005-237X) Printed in U.S.A.

POSTMASTER: Send address changes to Watchtower, **Wallkill, N.Y. 12589.**

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Chichewa, Chinese, Hiligaynon, Malayalam, New Guinea Pidgin, Polish, Sesotho, Swahili, Tahitian, Tamil, Thai, Twi, Ukrainian, Xhosa, Yoruba, Zulu

AVERAGE PRINTING EACH ISSUE: 7,800,000

Published by
WATCHTOWER BIBLE AND TRACT SOCIETY OF NEW YORK, INC.
117 Adams Street, Brooklyn, N.Y. 11201, U.S.A.

Executive Offices
25 Columbia Heights, Brooklyn, N.Y. 11201, U.S.A.

Frederick W. Franz, President Grant Suiter, Secretary

Are scientists redesigning life?

"The time has come," the Walrus said,
"To talk of many things: . . .
And whether pigs have wings."
—Through the Looking-Glass

PIGS with wings? Ridiculous! But scientists are beginning to predict that pigs may have wings in the future. More precisely, there is much talk of using a new technology called *gene-splicing* to create plants that do not need fertilizers, bacteria that mine ore and oil, and yeast that turns garbage into alcohol. In other words, scientists are starting to redesign living things.

Science fiction? Not when you consider what has already been done with gene-splicing, or recombinant DNA technology, as it is technically known. Here are some examples:

September 1978—California scientists using a synthetic gene for human insulin were able to make ordinary bacteria into tiny "factories" producing insulin. Insulin, of course, is used daily by many diabetics, some of whom are allergic to the animal insulin presently in use.

July 1979—Bacteria with human genes added produced a replica of the human growth hormone (HGH) molecule. At present, human growth hormone is the only treatment for pituitary dwarfism, which afflicts 20,000 people in the United States alone. The only source of HGH up to now has been the pituitary glands of human cadavers.

January 1980—Human interferon, a natural virus-fighting substance, was first produced by bacteria. Previously, interferon could be obtained only from human blood, with 65,000 pints of blood yielding only 100 milligrams of interferon (about 1/280 ounce)! Scientists are hopeful that interferon may turn out to be an antibiotic as effective against viruses as penicillin is against bacteria.

Scientists are enthusiastic about the rapid progress of gene-splicing experiments. If bacteria can be altered to make human insulin, HGH and interferon, what is next? "Anything that is basically a protein will be makable in unlimited quantities in the next fifteen years," predicts a scientist from the Massachusetts Institute of Technology.

Just what is gene-splicing? How does it redesign living things? What does it mean for the future?

Proteins, genes and you

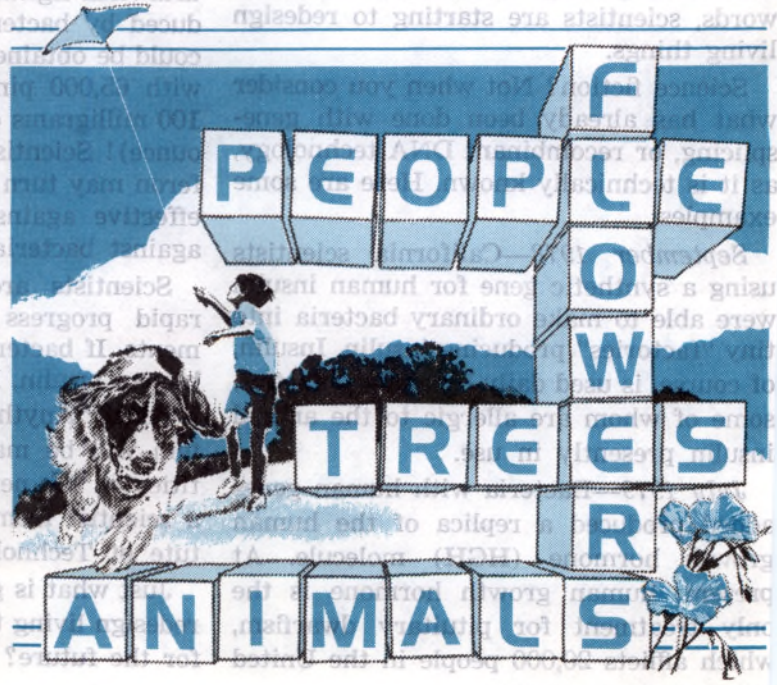
MENTION "protein" to most people and they think of a nice, juicy steak. But there is more to protein than that. Meat contains protein because living things, especially animals, are made from countless different types of proteins, each with specific jobs to do.

Types of proteins? Not counting water, about half of your body weight is protein molecules, but not all are the same. Some give strength to your hair, skin and nails. Others, called enzymes, control chemical reactions in your body cells. Still others form antibodies that help your body to ward off disease.

What are proteins made of? All your thousands of different proteins are made by linking together small molecules called *amino acids*. Only about 20 different types of amino acids are required to construct all the different proteins that help to form all the trees, flowers, animals and people on earth—just as a mere 26 letters in the English language can be combined to form hundreds of thousands of words!

Living cells hook amino acids together like railroad cars in a long train to make the proteins they need. To make insulin, for example, the cells in your pancreas construct two "trains," called amino-acid chains, which can fold themselves into distinctive shapes. The first chain is like a 21-letter "word" and the second chain is a "word" with 30 amino-acid "letters."

Just as a mere 26 letters in the English alphabet combine to form hundreds of thousands of words, only 20 different amino acids construct all the different proteins that form all trees, flowers, animals and people on earth



Then the chains are connected and your body has a molecule of insulin to help to control sugar levels in your bloodstream. Proteins like insulin are vital to good health, as diabetics know.

Plans and Blueprints—DNA and RNA

But how do your pancreas cells know which amino acids to hook together to make insulin? And what keeps the cells in your big toe from making insulin too? The answer lies in a unique and very large molecule called DNA (deoxyribonucleic acid), which is mostly contained in the nucleus of each of your trillions of cells. How does it work?

Have you ever been on a construction site? Perhaps you noticed groups of workers—carpenters, bricklayers, electricians—frequently consulting blueprints that tell them what to do. Where do the blueprints come from? In the main construction office there are many architectural drawings that are copied on special machines to make the blueprints. Various job foremen take the blueprints out to their crews on the site.

Your cells are like that construction job. In the nucleus (the "construction office") are the "original drawings" for all the proteins your body will ever need. These "drawings" are the DNA molecules. When you need insulin, the appropriate section of DNA, called a *gene,* is activated in the nucleus of special cells in your pancreas.

The DNA does not go outside the nucleus, just as original architectural drawings are not generally used on a job site. It is too valuable. Instead, a "blueprint" is made of the DNA gene by a special molecule called *messenger RNA* (ribonucleic acid). This "messenger" takes the blueprint out of the nucleus to the "job site," where a crew is waiting to build an insulin molecule.

This crew consists mainly of a *ribosome,* a sort of master carpenter molecule, and helpers called *transfer RNA.* The little helper molecules of transfer RNA round up amino acids and bring them to the ribosome. The ribosome "reads" the messenger RNA "blueprint" and makes the insulin chain.

In the "construction office" of each of your cells there are far more "drawings" than any given cell needs to function. The cells of your big toe, for example, have the genes for making insulin, but the genes cannot be activated. These drawings are "under lock and key" in your big-toe cells. Each cell uses only part of the DNA in its nucleus to make the things it needs. We can be glad this is the case, because cells that "break into" a set of drawings they should not use and start making proteins they should not may harm themselves, or other cells, or even become cancerous.

Changing the Plans

Most professional architects would strongly disagree if you suggested that the complex set of drawings used to control the construction of a giant skyscraper came into existence just by accident. Those drawings required a highly skilled, well-trained architect. The DNA in the cells of all living creatures contains instructions far more complex and detailed than a set of architectural drawings. Is it not reasonable that DNA—which controls the precise "construction" of bacteria, maple trees and people—should be the product of a Master Architect? That Master Architect is Jehovah God.—Gen. 1:11-28.

Ask any good architect how he feels about it when unauthorized, unqualified people make changes in drawings that have been painstakingly prepared for a specific building. He does not like it, because he knows that the person altering the drawing has probably not considered the overall consequences of his change.

True, a rest room might be enlarged, but what will happen when valuable space is lost from the entryway? What will happen when the plumbing has to be redesigned?

Scientists are now able to change the DNA content of living creatures—altering the "architectural drawings" provided by the Creator. In some cases these changes, such as inserting genes for human insulin into bacteria, are said to be for humanitarian, medical purposes. Other changes, such as inserting viral genes into embryonic mice, are more for scientific curiosity about what makes cells work.

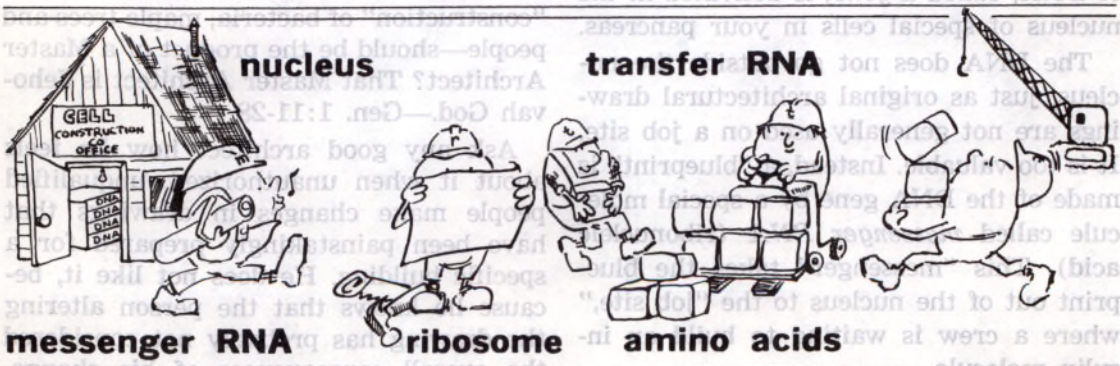
Although scientists are now able to alter genes, they are far from fully understanding how genes operate. In 1979 the New York *Times* reported: "The structure of animal genes, including those of humans, is far different from what had been believed for at least 20 years, new discoveries have revealed." What happened? It was learned that animal genes do not usually work the same way as bacterial genes, as scientists had thought. Animal genes are more complicated and contain long sequences of information that are not understood. In effect, scientists have learned that reading bacterial "master drawings" will not teach a person how to read human "master drawings," as they had expected it would.

Scientists also have learned recently that the genetic code of DNA molecules is not constant, as had always been thought. It turns out that the code is slightly different when the DNA is not in the nucleus, but in different parts of the cell called the *mitochondria*. "The dogma that the genetic code is universal has been shaken," admitted *New Scientist* magazine. Why does the code change? They do not know. "Some questions raised by the revelations of genetic analysis may never be answered," comments *New Scientist*.

No wonder, therefore, that people are concerned about possible dangers in genetic research! Most biologists now claim the research poses few risks, but do they really understand genetics well enough to know? Scientists claimed that atomic testing in the American West posed no dangers to the public back in the 50's, but the cancer rates of people living downwind of those tests now indicate that the scientists were mistaken.

Is it possible that, as they tinker with forces and biological processes they do not fully comprehend, scientists will accidentally unleash on mankind some terrible new disease? Some people think this possibility exists.

Just what are scientists doing to those genes anyway?



Promises and plasmids

CELLS are very small. About 500 average-sized cells could fit on the period at the end of this sentence. Yet each one of those cells generally contains all the DNA needed to construct a living creature, such as you.

Obviously, if cells are small DNA molecules must be very tiny indeed. They are shaped like long, twisted threads, so long that all the DNA in your body laid end to end would stretch to the sun and back many times! But the threads are very thin, only about one ten-millionth of an inch (1/400,000th mm) across.

To complicate matters, these long, thin threads of DNA must somehow be packed inside the cells, and the only way to fit them in is for them to be twisted up into very tight bundles. This makes it difficult for scientists to locate the exact areas of the particular DNA molecules they may be interested in, the *genes*. Scientists cannot just put a cell under a microscope, find the gene they want and then extract it with tweezers and put in another gene.

Plasmids to the Rescue

It turns out, however, that bacteria often contain some DNA molecules that are easier to work with. These strands of DNA are more or less independent from the rest of the DNA in the bacteria, forming loops all to themselves that can easily be passed from one bacterium to another. They are called *plasmids*. At present plasmids are the keys to gene-splicing.

Splicing genes into plants and animals is not so easy because these cells do not have plasmids, and their genetic regulatory systems are much more complicated. But scientists are hopeful that such splicing will soon be possible. If they succeed, then they will be able to put genes in plants from bacteria that fix nitrogen in the soil so that it will not be necessary to add nitrogen fertilizer to the soil. They are also hoping that someday they will be able to cure genetically caused diseases, like sickle-cell anemia, by replacing defective genes in humans.

"A bug is being perfected, which is capable of recovering oil, while others are being programmed to extract metals from below the earth's surface," writes Drummond C. Bell, chairman of National Distillers and Chemical Corporation, in *Leaders* magazine. "The new frontier has already produced, or is on the verge of producing, human insulin to combat diabetes; cancer-fighting interferon made from human cells; and vaccines to prevent diseases such as hepatitis and malaria; as well as hormones to remedy dwarfism and hemophilia, and others that will accelerate the growth of cattle and hogs. Discoveries in progress also include a low-calorie, high-fructose sugar, plants capable of generating their own fertilizer from the air, a strain of wheat with double the protein content of current strains and another variety of wheat that requires a tenth of the water of those farmed today."

Also, it is now claimed that through gene-splicing a safe, effective vaccine against foot-and-mouth disease in livestock has been produced.—*Time,* June 29, 1981.

No wonder gene-splicing has suddenly become a big business. However, this shift from laboratory bench to production line has some people alarmed. Why?

How do you splice a gene?

SUPPOSE you wanted to splice a gene. How would you go about it?

First, you would need the gene, a section of DNA containing the "code," or "master drawing," for a specific protein. "Gene machines" are now available to synthesize simple genes from inert chemicals. More complicated genes might have to be located and isolated from the DNA of living cells.

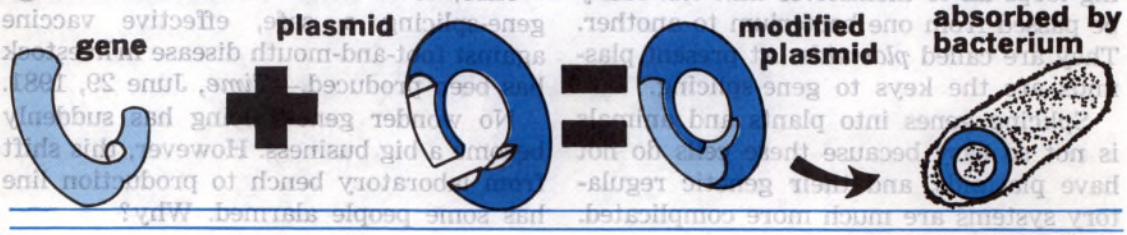
Next, you would need a plasmid and a special chemical called a *restriction enzyme,* which chemical would break the plasmid open at the right spot, leaving "sticky ends" for the attachment.

You might also need to make sure that your new gene was properly attached to a special gene that acts like an "on switch" for the gene you want to splice. Otherwise your new gene might never work. After all, neither the plasmid nor the bacteria you are putting it into have any real use for the new gene. The gene is not doing *them* any good, so why should the bacteria waste time and energy producing whatever the gene codes for?

The idea of the "on switch" is to trick the bacteria into thinking they are producing something they need, when really they are producing something *you* need. The switches are called "regulatory genes."

Now, put the combined regulatory gene and the new gene together and mix them up with lots of sticky plasmids. Some of the plasmids will hook up with the new genes and form themselves back into loops. Next, put the "spliced" plasmids in a dish with lots of bacteria, and some of the bacteria will absorb some of the plasmids. Bacteria swap plasmids commonly. Plasmids, for example, are usually where they get new genes that make them immune to antibiotics.

If all has gone well, *at least some* of the bacteria will have absorbed plasmids with your new genes on them, and *at least some* of the plasmids will be operating inside the bacteria, using the bacteria's ribosomes and other "workers" to produce whatever you want produced. The bacteria have become a tiny "factory" at your service. But this factory has the special advantage of reproducing itself. The bacteria divide and produce more bacteria, all containing your special gene, all making the protein you want.



Gene-splicing, Inc. —a risky business?

"IT WAS an action rarely precedented in science," marveled *Science News* magazine. In 1974, just as scientists were beginning to develop the basic techniques of gene-splicing, an urgent warning was sounded concerning possible hazards of their experiments. What was so unusual about that? Those issuing the warning were not ill-informed alarmists but the very scientists in the forefront of genetic research.

Their concerns were expressed in what became known as the "Berg letter," named after Paul Berg, a Stanford University scientist who shared a 1980 Nobel Prize in Chemistry for his gene-splicing work. Another prominent signer of the "Berg letter" was James D. Watson of Harvard, who became famous in 1953 when he helped figure out the structure of DNA (for which he also received a Nobel Prize).

Berg, Watson and nine other distinguished scientists were concerned that gene-splicing might lead to "the creation of new types of infectious DNA elements whose biological properties cannot be completely predicted in advance." In other words, what if somebody created a new germ and it got loose and caused a terrible disease epidemic? The letter called for a moratorium on certain types of experiments and for the development of guidelines to make sure all future experiments were safe. The "Berg letter" resulted in an elaborate set of guidelines on gene-splicing issued by the National Institutes of Health (NIH).

Meanwhile, it was becoming obvious that, risky or not, gene-splicing was a potential gold mine for business. Could bacteria make a cheaper, more reliable insulin? As biology professor Jonathan King points out, "the sale of insulin to diabetics is a $100-million-a-year-business." Could better genes in plants improve crop yields, or reduce the need for fertilizer, or create plants that are more nutritious? Imagine the market for such plants. "Agriculture is still the world's largest business," notes biology professor Bonner of Caltech.

These possibilities have led to the rapid formation of new types of businesses specializing in genetic engineering. One such company, Genentech, was cofounded in 1976 by a professor who had signed the "Berg letter." The professor put up $500 for his share of Genentech, but when the company's stock went on public sale in 1980, his shares were suddenly worth $40 million! Obviously, people who buy stock think gene-splicing is going to be a big business. "This work is broader in importance than anything since the discovery of atomic particles," boasts one drug company vice-president.

In the last few years, numerous small firms such as Genentech have been started, and giant corporations like Standard Oil of California, Monsanto and Du Pont are spending millions on genetic research. Last June the Supreme Court of the United States created a stir by ruling that genetically altered forms of life could be patented like any other invention.

The smell of money is in the air, and, not surprisingly, scientists have recently

been spreading the word that perhaps gene-splicing is not so risky after all. They point out that the strains of bacteria used in most experiments cannot survive outside the laboratory. In general, they say, altered DNA creates organisms that are genetic "cripples" and therefore less dangerous to man than the wild variety. Dr. Watson perhaps typifies the new attitude when he now calls his signing of the "Berg letter," "the silliest thing I did in my life."

Do scientists have strong scientific evidence for this new opinion? No, admits Dr. Berg. "There isn't a whole lot more data," he says. "It's just that we've thought about it a bit more; we've come down on the other side of the fence with much the same data."

What if somebody created a new germ and it got loose and caused a terrible disease epidemic?

Dr. Berg further observes that, "although there are a lot of confident statements on the record, the people making them all have a clear vested interest in the field."

Similar concerns are raised by science historian Susan Wright, who notes that at least one decision to relax the NIH guidelines "is not based on empirical data but on the opinions of scientists." The trade publication *Chemical and Engineering News* admits that, while gene-splicing has a good safety record so far, "a handful of critics, however, say that the case for judging recombinant DNA work to be safe is far from convincing, and that a kind of steamroller effect is smashing any remaining doubts without really answering still open questions."

The question of safety is especially important now, because small experiments do not make money; massive production facilities do. "Now that the technology is moving out of the laboratory into large-scale commercial production facilities the need for protective regulations is increased enormously," warns George Taylor, a safety expert for the AFL-CIO. Obviously, there is a big safety difference between having a few bacteria in a petri dish and having large vats full of bacteria pumping out commercial quantities of insulin, interferon, or any other protein.

Yet the guidelines from NIH were intended for laboratory research and were implemented on a voluntary basis. Those guidelines are steadily being relaxed and there is no mechanism to enforce even the relaxed guidelines on industry. Biologist King complains that "the guidelines have now been so weakened that rather than protecting public health, they in fact protect those engaged in the technology from public inquiry and regulation."

Could man's haste to exploit this new technology lead to a biological *Three Mile Island*?

Another question that needs to be asked is, Can gene-splicing really do what scientists claim it will do? It is hoped, for example, that genetically altered plants will be able to fix their own nitrogen from the soil, doing away with much fertilizer and the expense and energy needed to produce it. Could such plants be engineered?

Scientists know that certain plants, such as soybeans, do not need extra nitrogen because they have bacteria living in their root systems that fix nitrogen for them. The bacteria, in return, get food from the plants. This symbiotic arrangement suits both the soybeans and the bacteria, and was apparently designed by the Creator. Scientists would like to improve on the arrangement.

But there are problems. First, it is not nearly so easy to get foreign genes to function properly in plants as it is to get them to work in bacteria. There are no plasmids to help out, and plants are more complicated than bacteria.

But if the genetic problems can be overcome, an even bigger problem of basic chemistry remains. Nitrogen atoms are naturally stuck together in pairs. Before a plant can use the nitrogen, those pairs have to be "pried" apart. This takes a great deal of energy, regardless of whether the nitrogen atoms are pried apart by man in the manufacture of fertilizer, by bacteria, or by the plant itself. "The energy cost that the plant must pay to have that process is not a small cost," concedes a plant scientist. The lost energy would likely result in smaller plants with much lower yields per acre.

Evidently, then, the Creator's idea was not so bad after all.

True, gene-splicing can make bacteria produce chemicals men desire. But does it make them better bacteria? No. To the extent that these tiny "factories" are turning out products worthless to them, they are wasting energy that could be used to make them grow faster or stronger. From the bacteria's point of view, the gene-spliced variety are really inferior.

If man cannot improve on the design of the lowly bacterium, can he truly expect to improve on the design of far more complicated plant or animal cells? Scientists marvel at the flight of the aerodynamically "impossible" bumblebee, the navigational instincts of migrating birds, the long-range communication of whales, the geometric and architectural perfection of bone tissue. Are they really prepared to improve on the Creator's designs? A young child may have learned to take his father's pocket watch apart, but does that mean he could design a superior watch?

So it is with modern scientists. They have taken a few simple organisms apart, and they admit they do not fully understand what they have found inside. Since scientists do not understand the function of long stretches of DNA, they claim that such DNA is "vestigial," or "nonsense." (Doctors used to talk that way about the appendix and the tonsils, before they learned better.)

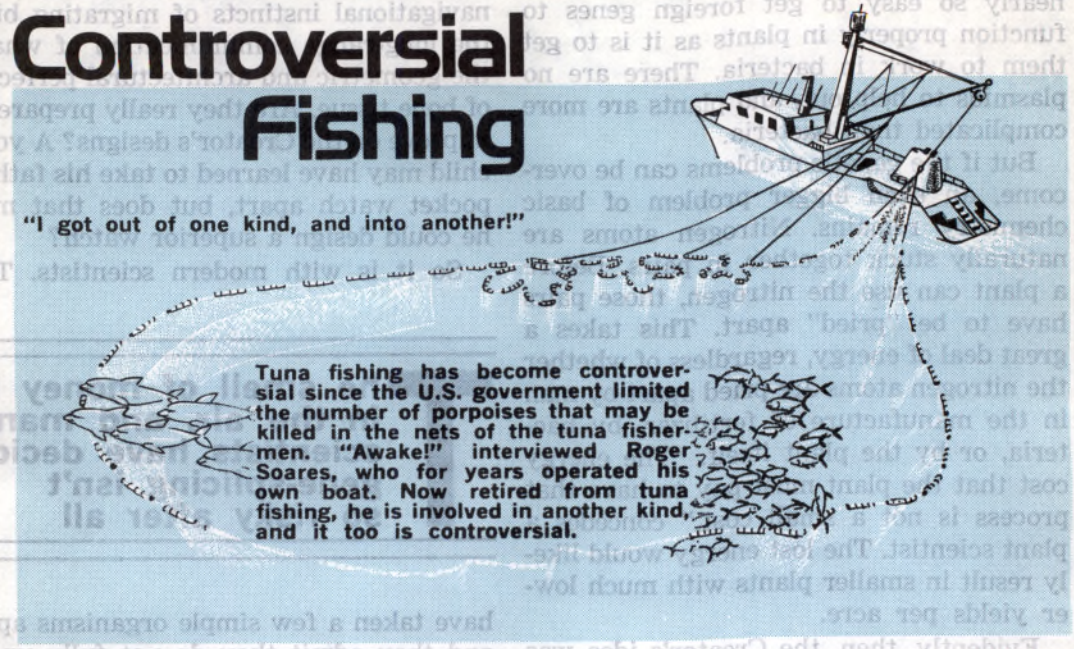
The smell of money is in the air, and many scientists have decided gene-splicing isn't so risky after all

There is nothing wrong with intense curiosity about how living things work. If men use their inborn curiosity to learn humbly from the designs of Jehovah God, they will profit. But if they greedily and arrogantly seek to redesign God's creation radically for material gain, they will ultimately come to grief.

MEN VERSUS WOMEN

With regard to cancer, there appears to be a distinct difference between men and women. Only 10 percent of the cancer in men is in a specifically sex organ, the prostate. Yet nearly 40 percent of the cases in women involve cancer of the uterus or breast, organs that are associated with reproduction.

Controversial Fishing



Tuna fishing has become controversial since the U.S. government limited the number of porpoises that may be killed in the nets of the tuna fishermen. "Awake!" interviewed Roger Soares, who for years operated his own boat. Now retired from tuna fishing, he is involved in another kind, and it too is controversial.

By a Staff Writer

"THE purse-seine net encircled the herd of porpoises, its top edge supported by cork floats, the rest of it sinking many fathoms down into the water. It formed a circular wall of net with no bottom and deep enough to enclose the yellowfin tuna that swam beneath the porpoises. As others pursed shut the bottom of the net, I and a couple of other young men jumped into the water to help the porpoises over the corkline and set them free. It was dangerous work, for sharks were also encircled by the net."

Thus Roger Soares described one of his jobs in the early days of his career as a tuna fisherman. It emphasizes one point: responsible fishermen value the porpoises and try to save as many as possible.

"Roger, how did you get started," I asked.

"Through my dad. He is Portuguese. Most of the tuna fishermen out of San Diego in those days were Portuguese, Italian or Japanese. He started when he was 10. It was pole fishing then; the nets came later. He and his brother worked together, finally got a boat of their own, and eventually several boats. At 16 I started working summertimes on my dad's boat. It was pole fishing, with bait. At that time, 1956, there were only five or six bait boats on the West Coast that had converted to using purse-seine nets made of nylon. A couple of years later I worked with nets—that's when I would dive in to help the porpoises over the corkline."

"With the sharks?" I prompted.

"With the sharks. There were some injuries. One boy I knew died from a shark attack." After a pause he continued: "By the time I was 21 I became captain on one of the boats, a big purse seiner."

The Porpoise Becomes a Factor

"And with the purse-seine net," I said, "porpoise and fishermen become involved."

"That's right," Roger said. "When it was all pole fishing it was noted that the yellowfin tuna were often under the porpoise herds. So when the nets came into use they were dropped around the porpoises to catch the tuna that swam beneath them."

"Is it known why the tuna swim under the porpoises?" I asked.

"There may be some kind of communication. Maybe the porpoises kick up a lot of feed with their diving and jumping, and the fish grab it. We also find tuna under logs and debris, because of the shade or, possibly, sound created there. Maybe that's why the tuna swim under the porpoises—the shade from the porpoises. There may also be other reasons."

"However," he continued, "not all porpoise herds carry tuna under them. We don't know why. We have to look for certain signs. Are there fish jumping around them? Are man-of-war birds circling high overhead? Do you see little white pigeons close to the water? These are telltale signs that tuna are present."

"After you've located porpoises with tuna under them," I asked, "how do you proceed?"

"Speedboats are sent out to turn and bunch up the porpoises. The tuna remain underneath them. The net is stacked on the back of the boat, one end attached to what is called a purse-seine skiff, the other end to the big boat. The skiff slides down into the water pulling one end of the net down with it. The big vessel makes a circle around the porpoises, pulling the net along behind it. All the while the speedboats keep the porpoises within the encircling net until the circle is closed. Then the bottom of the net is pursed shut . . ."

"You mean," I interrupted, "as you would draw the purse strings to close a money pouch?"

"Exactly. Then the corkline holding the net at the surface of the water begins to be drawn in until it tightens around its load of fish, and, of course, the porpoises also. In the past many porpoises died in the nets and the environmentalists were incensed. The U.S. government set limits on the number of porpoises that could be killed, and this enraged the fishermen."

Coping with the Quotas

I asked about the quotas.

"In 1977," he informed me, "the quota allowed a kill of over 62,000. The fishermen killed 24,100. By 1980 the quota had dropped to 31,100, and only 12,400 were killed."

"How were the fishermen able to cut the kill rate so much?" I asked.

"By what they call a backdown maneuver. When the bottom of the net has been pursed, or closed, the upper corkline is drawn in enough to lose its slack and form an even but still big circle all the way around. The boat is put in reverse and as the boat backs up it puts a drag on the net loaded with fish. This causes the floating corkline farthest from the boat to sink a foot or two beneath the surface of the water. This becomes an escape route for the porpoises. Men go to this area and help porpoises over the corkline.

"Not all get across. Some will dive instead, and they may get their snouts entangled in the net and suffocate. To cut down this loss, fine-mesh netting in crucial sections has replaced the coarse netting. Originally the nylon mesh openings were four and a half inches (11 cm), and porpoise snouts poked through it and the animals became entangled. With the fine-mesh netting the snouts will not penetrate and no entangling occurs."

"How big are the nets?" I asked.

"When I first started they were 450 fathoms long and 36 deep. A fathom is six feet. Now they are over 1,000 fathoms long and go down 70 or 80 fathoms."

"I'm sure that it has cost the fishermen

time and money to save more porpoises," I said. "Even so, I read that a few years ago a catch of tuna was worth a million dollars. It must be much more now."

"It's more, but fuel prices have skyrocketed. A boat out four or five months spends several hundred thousand dollars on fuel alone. The food it carries for the crew costs more. Mortgage interest is higher. As you said, meeting the government's kill-rate quotas costs time and money—something their competition sailing under foreign flags doesn't have to worry about. And, finally, all of this is still a gamble until you have your ship's hold filled with tuna."

"You make it sound ominous."

"The fisherman makes a good living, but on the basis of an hourly wage, it isn't all that much."

"You're retired now," I said. "You must have some good memories of your years at sea."

Memories

"Yes, I do. Men working hard as a team. Big catches. The sea, peaceful and calm. Or exciting storms as wind and waves go wild. And the porpoises. They are so smart. There are some that can never be caught. They won't be bunched up by the speedboats, won't react to anything we do. They see us coming and leave, taking the tuna with them.

"And yet, smart as they are, why don't more of them jump over the corkline and escape? The fishermen think it may be their sonar that reports the line and the net as obstacles. One time while in the water I was helping them over the corkline, and one of them came up to me and put its snout under my arm and kept shaking its head in the air for me to get its snout over the net. I was touched. I understand how people can become emotional about them.

"One experience I'll never forget. We had sighted a big school of porpoises. We knew it carried lots of tuna under it—fish were jumping, birds circling. We also saw two killer whales—like Shamu at Sea World, only these were wild. They were stalking the porpoises, one on each side of the school. For half a day they followed the terrified, fleeing porpoises, tiring them out. At times three or four porpoises would leave the school, trying to lure the whales away. No success, and the school, exhausted now, bunched together. The whales then raced into the center of the school.

"I still hoped to get the tuna that were under the porpoises, so I steered the boat into the middle of the school, hoping to scare off the whales. But they know no fear. Suddenly one of them shot out of the water 10 feet (3 m) from me and grabbed a leaping porpoise in midair, like a dog snatching a bone. I'll never forget that leap and his disappearing into the crystal-blue depths with the porpoise in his mouth."

We both sat silent for a while, thinking. Finally I asked, "You're retired now. Why? You're still a young man."

"There are a number of reasons. I quit in 1972. The pressure was increasing. The industry was having more and more problems. The environmentalists were on our

In Future Issues

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backs. The government put us in a regulatory net and kept pulling the purse strings tighter and tighter. That wasn't all bad. It did make the fishermen save thousands of porpoises. However, it also increased our costs and cut down on our catches. Mainly, I guess it was the pressure. I felt as if I were in a goldfish bowl, with government and groups taking pokes at me. I just no longer felt up to all the hassle, so I quit."

Roger smiled as he added: "I got out of one kind of fishing and into another, and both of them controversial."

The Other Kind of Fishing

"That," I said, "calls for some explaining. I know the kind you got out of, but what kind did you get into, and how did you get into it?"

"Jesus tells what kind, at Matthew 4:19: 'Come after me, and I will make you fishers of men.' The 'how' is a longer story." He took a moment to marshal his thoughts, then began.

"I was a Catholic. My wife, Elizabeth, was also. I became disillusioned with Catholicism and all religion. Our biggest fights were over going to church—she wanted to, I didn't. I would go, then walk out, and the children would leave with me. That really upset her. 'You're setting a bad example,' she would protest. 'I'm sorry,' I'd say, 'but there's nothing here for me.'

"I believed in God. Out fishing I'd seen many awesome displays of his power, and I often thought of the 107th Psalm: 'Those going down to the sea in the ships, doing business on vast waters, they are the ones that have seen the works of Jehovah and his wonderful works in the depths; how he says the word and causes a tempestuous wind to arise, so that it lifts up its waves. They go up to the heavens, they go down to the bottoms. Because of the calamity their very soul finds itself melting. They reel and move unsteadily like a drunken man, and even all their wisdom proves confused. And they begin crying out to Jehovah in their distress, and out of the stresses upon them he brings them forth. He causes the windstorm to stand at a calm, so that the waves of the sea keep quiet. And they rejoice because these become still, and he leads them to the haven of their delight.' "

By this time Roger and I had been joined by Elizabeth. She related her eventual disenchantment with the Catholic Church when a "Las Vegas" night was held. There was gambling, the husbands were dealers, the wives cocktail waitresses, a homosexual priest was there—the whole evening was a blow to her faith in the Church.

"Two things then happened," Elizabeth recalled. "My daughter came home from Catholic school one day and said: 'OK, Mom, that's it. I'm not going anymore.' I was shocked. 'What do you mean? Don't you want to learn about God?' 'I'm not learning a thing,' she said. 'There's bad language, bad conduct. I'm wasting my time.' So I took her out. I was worried, prayed a lot, and wanted God to be in the lives of my family.

"It was about that time that the second thing happened: a tract was left at our home."

Roger took up the story.

"My wife gave me the tract and said, 'Why don't you read this? It sounds good.' I did. It sounded good. We learned later that it was from Jehovah's Witnesses and that my mother had been studying with one of them for over a year. She sent this Witness over to talk to us. I got into an argument with her. 'How do you know your religion is the right one? Religion's a big rip-off!'

"Nevertheless, the outcome was a Bible study in our home. I sat in on it only to monitor it: it might be Communistic and I didn't want my wife and children brain-

washed. The result? Not Communism, not brainwashing, but proof from the Bible.

"That first study was on a Monday evening. Tuesday evening we went to the Witnesses' meeting at their Kingdom Hall, and before the month was over we went to one of their conventions. My wife and I were baptized. This happened in 1976. We've been active Witnesses ever since."

"Wasn't that a fast switch for you, from thinking religion was a rip-off to devoting your life to it?" I asked. "How do you explain that?"

"What I learned about the Bible impressed me, yes, but I think that at that time the main thing was the Witnesses themselves, especially the children. They sat quietly through the meetings, answered questions, were used on the programs. We also went through the Witnesses' printing plant at their world headquarters in Brooklyn, New York. Again it was the examples we saw—hundreds of young men and women devoting their time freely to produce Bible literature."

New Fishing, New Controversy

"I suppose this connects up," I said, "with your statement that you're into a new kind of fishing now."

"It does. Earlier I quoted Jesus' words to Peter and Andrew, fishermen who were letting their net down into the Sea of Galilee at the time. He told them to follow him and he would make them 'fishers of men.' Immediately they entered into this new kind of fishing, and that's the kind I'm into now."

"You also said it was controversial," I reminded him.

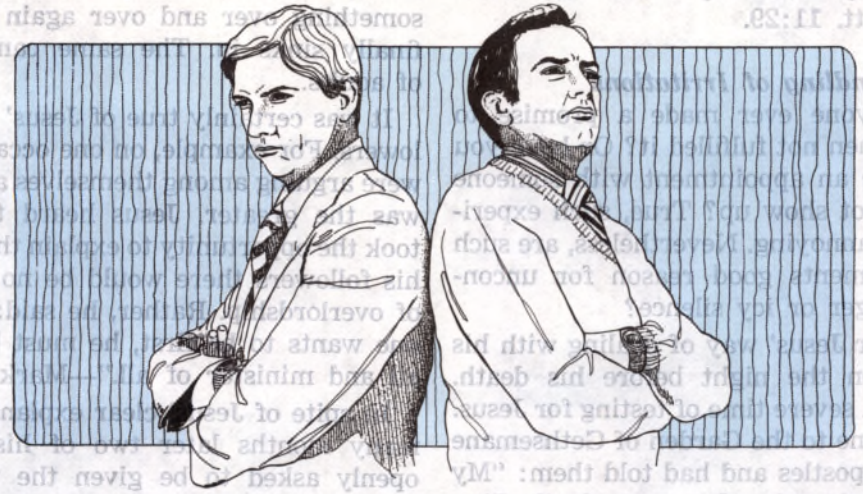
"We prefer it not to be," Roger said. "However, Jesus warned that it would be, that it would divide families and bring persecution from men and nations. Jehovah's Witnesses have found it to be so. Their work as 'fishers of men' has even been banned in many countries at various times. In my tuna fishing there was some justification for the government regulations; there is no justification for interfering with 'fishing for men.'"

We sat silent for a moment, then Roger summed it all up, saying: "So you see, this is the second time around for me in controversial fishing. Only this time the controversy is not over the saving of as many porpoises as possible, but the saving of as many people as possible."

BRIGHT SIDE OF DIVORCE?

One Soviet marriage out of three now ends in divorce. But rather than viewing the rapidly rising divorce rate with alarm, Soviet authorities apparently try to give the statistics a positive turn. Female sociologist Zoia Yankova writes that the fact that Soviet women most often initiate divorce proceedings "proves that the Soviet woman has achieved full emancipation and is in as good a position to divorce as men are."

When People Irritate Us



RECENTLY, a tourist in the Orient reported to the hotel manager that his watch was missing. When, after some time, the watch had not been returned, the tourist became convinced that the manager had ignored his complaint. In his irritation, he threw all his clothes, a wastebasket and a television set out of the window of his 18th-floor room into the pool area below!

Have you ever been so frustrated at other people that you felt like reacting violently? Many have. Others become quiet when offended, thinking, 'I'll never speak to him again!' This happened in a small town in the Philippines where two men were in conflict over the ownership of a plot of land. For a long time, neither would speak to the other. But are these the best ways to handle a situation when people irritate or offend us?

Such reactions only add to the problem. The tourist did not get his watch back because of his tantrum; but likely he did get a large bill for damages. The silence of the two neighbors did not solve the land problem; but it did cause distress and embarrassment to their families, friends and neighbors. Surely there must be a better way!

Jesus Christ showed a more effective way. Like us, he was surrounded by imperfect and fallible people, and sometimes their failings distressed him. Sometimes he was "indignant," or "groaned deeply with his spirit" at people's actions or attitudes. (Mark 8:12; 10:14) But he did not react violently or withdraw into long periods of silence. Rather, he often tried to help people to recognize their problems and overcome them.

Jesus was able to do this effectively because of his deep love for his fellowman, especially his followers. As he said to them: "I am giving you a new commandment, that you love one another; *just as I have loved you,* that you also love one another." This love was especially seen when Jesus dealt with human weaknesses. Further, he was able to handle these in a

balanced way because, as he himself said: "I am mild-tempered and lowly in heart." Handling personal difficulties in a mild and humble way is usually successful.—John 13:34; Matt. 11:29.

Jesus' Handling of Irritations

Has anyone ever made a promise to you and then not fulfilled it? Or have you ever made an appointment with someone who did not show up? True, such experiences are annoying. Nevertheless, are such disappointments good reason for uncontrolled anger or icy silence?

Consider Jesus' way of dealing with his apostles on the night before his death. This was a severe time of testing for Jesus. He had gone to the Garden of Gethsemane with his apostles and had told them: "My soul is deeply grieved, even to death. Stay here and keep on the watch with me." (Matt. 26:38) Then he went a little way off to pray. When he came back, what did he find? All the disciples were asleep! In waking them up still he reacted with compassion.

Jesus recognized that their motive was not bad but that they were subject to human imperfection. Hence, he said: "The spirit, of course, is eager, but the flesh is weak." (Matt. 26:36-46) Even later, when the apostles abandoned him to his enemies and Peter denied him, Jesus did not give up on his friends. Instead, he took steps after his resurrection to strengthen them and to help them to overcome their weaknesses.

What a fine attitude! The apostle Paul said: "Love . . . hopes all things." Hence, instead of giving up on our friends when we feel let down by them, why not—like Jesus—recognize that perhaps their motive is good although they suffer from human imperfection? This is a loving thing to do, and may lead to helping them not to let us down next time.—1 Cor. 13:4, 7.

How About Repeated Failings?

Of course, problems are not always solved with one reminder. As parents well know, children usually have to be told something over and over again before it finally sinks in. The same can be true of adults.

It was certainly true of Jesus' early followers. For example, on one occasion they were arguing among themselves about who was the greater. Jesus heard them and took the opportunity to explain that among his followers there would be no positions of overlordship. Rather, he said: "If anyone wants to be first, he must be last of all and minister of all."—Mark 9:35.

In spite of Jesus' clear explanation, not many months later two of his apostles openly asked to be given the two most important positions next to him in the Kingdom. The others were angry, but Jesus did not get angry. Rather, he patiently explained once again: "You know that the rulers of the nations lord it over them and the great men wield authority over them. This is not the way among you; but whoever wants to become great among you must be your minister, and whoever wants to be first among you must be your slave."—Matt. 20:24-27.

Once more, the night before Jesus died, the record tells us, "there also arose a heated dispute among them over which one of them seemed to be greatest." Yet again, Jesus patiently repeated his explanation that among his followers there were no positions of overlordship, only *service*. This time, in order to impress the point more firmly on their minds, he gave a practical demonstration. With his own hands, he washed the feet of each of the apostles there present. That was what he meant by "minister"!—Luke 22:24-27; John 13:3-5.

At last, the apostles seem to have grasped the point. Many years later, the

apostle Peter wrote a fine letter to the Christian congregations, wherein he passed this information on. He explained to those taking the lead in the congregations that they 'should not lord it over those who are God's inheritance, but should become examples to the flock.'—1 Pet. 5:2, 3.

We, too, will respond properly to the repeated irritations to which others may subject us, if we react as Jesus did. We can do this if we cultivate the same kind of love, mildness and lowliness of mind that Jesus possessed.

Following Jesus' Example

Jesus counseled us to be loving and forgiving to our spiritual brothers even if we had to forgive them "up to seventy-seven times." However, what if our brother commits a serious offense? Jesus urged us to speak to the offender personally and in private. Then, "if he listens to you," said Jesus, "you have gained your brother." —Matt. 18:15, 22.

In handling such situations, however, it is good to remember that while Jesus was perfect we are not. If our friends irritate us, likely we do the same to them from time to time. What a fine thing to handle *their* offenses against us the same way we would want them to handle *our* offenses against them—with love, mildness and humility! This is truly applying Jesus' words: "All things, therefore, that you want men to do to you, you also must likewise do to them."—Matt. 7:12.

Recognition of our own imperfections will help in another way. Jesus had remarkable perception and could discern the motive and heart condition of people. We are limited in this regard. If we feel hurt or irritated, it may be we have misunderstood the situation and that nothing bad really was intended against us. For example, on the occasion mentioned in the introduction, the tourist was mistaken. The manager had handled the matter, and the police were actually investigating the case.

Even if we are convinced that we are in the right, we should still be humble. This makes it much easier for someone else to want to put right any wrong he may have done. Jesus said the purpose of speaking to the one who had offended us was to 'gain our brother.' Handling the problem with mildness and humility will likely bring this about.

That was the experience of the two men who refused to speak to each other because of a land problem. After an extended period of silence, they unexpectedly found themselves sitting next to each other in a public conveyance. One was humble enough to apologize for his wrong attitude. That 'broke the ice,' and the two men embraced. Now their problem could be handled in a peaceful way, without causing distress and embarrassment to those around them.

Yes, three Christlike qualities—love, mildness and humility—can improve our relationship with others. When people irritate us, these qualities can help us to handle the situation in a constructive way, usually with happy results. Surely they are qualities that none of us, if we carefully think about it, can do without!

"Doing nothing out of contentiousness or out of egotism, but with lowliness of mind considering that the others are superior to you, keeping an eye, not in personal interest upon just your own matters, but also in personal interest upon those of the others."—Phil. 2:3, 4.

'QUEEN OF THE HIGHWAYS'

DO YOU like history? If so, you may have observed that it is not always easy to find a reliable historical source. Ancient historians, for example, often exaggerated, or related obvious myths and impossible legends as truth.

A noteworthy fact that many people do not realize is that the Bible is an exception to this pattern. Although it is a book of ancient history, time and again the details it gives about events and places of interest have proved to be reliable and accurate. An ancient road leading to Rome from the south is an example. It is called the Appian Way.

Constructed around the year 300 B.C.E., the Appian Way was already well used when the apostle Paul trod its hard, lava stones about the year 59 C.E. Paul traveled quite a bit of this road, called by Roman poets *longarum regina viarum*, or "queen of the long distance highways." Would you like to retrace his journey?

Arrival at Puteoli

Leaving Malta, where they had been shipwrecked, Paul and his companions traveled on with an army officer, for Paul was a prisoner who had appealed his case to Caesar Nero. They arrived in Italy at Puteoli (modern Pozzuoli, near Naples). The account says: "Here we found brothers and were entreated to remain with them seven days."—Acts 28:14.

The army officer evidently did not object. Should we be surprised? No, because ancient Puteoli was a resort area, "a favorite watering-place of the Romans, as its numerous hot-springs were judged efficacious for the cure of various diseases."—M'Clintock and Strong's *Cyclopædia*.

While Paul was with them, the Christians in Puteoli may have explained to him that the road to Rome, although famous, was not an easy one. If you look at a map of Italy (see illustration) you might think that Paul would travel straight up the coast to Rome. But this was not possible. While a coast road would be built a generation later, under Emperor Domitian, a detour inland was needed in Paul's day. After going inland to Capua, Paul would take the 'queen of the highways' to Rome, 132 miles (212 km) away.

Capua to Tarracina

When he arrived in Capua, Paul had reached the original ending point of the Appian Way. Long before Paul's day, however, the road had been extended east to Beneventum, where it underlies the modern highway used today. From Beneventum (modern Benevento) the Appian Way continued southeast through Venusia (Venosa) clear down to Tarentum (Taranto)

and Brundisium (Brindisi), harbors in the "heel" of the Italian "boot" 230 miles (370 km) away.

Indeed, it was these seaports that made the Appian Way so important to the Romans. The Appian Way became the first leg of any Roman trip to Greece. As the Roman Empire expanded eastward there was intense traffic on the 'queen of the highways.'

Paul, of course, would not be traveling east to Beneventum and on to Brundisium and Greece. He was going west and north to Rome. What was his trip like?

Perhaps the beautiful scenery would have compensated for the bumpy road as Paul left Capua, passing through the hills of Campania toward the Italian coast. The road was bumpy because it was paved with hard polygonal blocks of lava stone, somewhat like giant cobblestones. But the stones did not tell the whole story. Underneath them the Romans had removed the topsoil until a solid foundation was uncovered. Then on this, several layers of material were placed—large stones, crushed stone and gravel mixed with mortar. Finally, the surface of the road was paved, being slightly crowned so water would run off. Roman roads were built to last!

As Paul approached Tarracina (modern Terracina) the road began to run along the coast, and a stupendous panorama was seen as rocks plunged down to the sea amid beautiful vegetation. The 68-mile (109-km) trip from Capua to Tarracina doubtless took several days, but lodging was available. Major Roman highways featured posting stations, called *mansiones,* every 15 miles (24 km) or so. Here the weary traveler could get a meal or could stay overnight, even changing horses or repairing his wagon.

Public taverns, called *tabernae,* were also found on the road, but they had a reputation for rowdy patrons. The *tabernae* "were full of pickpockets, commodities were lacking and the clientele comprised the scum of the Empire," says the book *Great Roman Roads of the World.*

Like Puteoli, Tarracina was a resort town in Paul's day. Perhaps someone pointed out to him the luxurious villa built there for Emperor Tiberius. Today ruins of that villa can still be seen, as well as once sumptuous temples, baths and theaters. Paul could hardly have avoided noticing the great temple of Jupiter Anxur, which dominated the city.

Tarracina to Three Taverns

The Appian Way meandered a bit in the hills between Capua and Tarracina, but from Tarracina to Rome it ran straight as a ruler. Of course, straight roads in hilly country are often steep, and near Tarracina the Appian Way was very steep indeed, especially in Paul's day. Later, in the days of Emperor Trajan, a cliff was cut away to a depth of 120 feet (37 m) to avoid the steep climb over the mountain on which Tarracina stood.

Paul's sharp descent from Tarracina

brought him to a swampy, lowland area called the Pontine Marshes, a very unpleasant portion of his journey. Roman poet Horace, who made the trip about a century before Paul, complained eloquently about "the stench of the water," which "made war on my appetite," as well as the "marsh frogs and angry mosquitoes."

Perhaps Paul's Christian brothers in Rome realized that he would likely be fatigued and uneasy after this disagreeable leg of his journey as a prisoner to Rome. So the Bible account tells us that, rather than waiting for Paul in the comfort of their homes, the brothers came to meet him on the road. We read: "And from [Rome] the brothers, when they heard the news about us, came to meet us as far as the Marketplace of Appius and Three Taverns and, upon catching sight of them, Paul thanked God and took courage." —Acts 28:15.

The Marketplace of Appius was just at the entrance to the Pontine Marshes, some 43 Roman miles (63 km) from Rome. Three Taverns was another 10 Roman miles (15 km) down the road toward Rome. Truly, these early Christians exerted themselves to travel all that way to encourage their brother Paul.

On to Rome!

Paul did not need the brothers from Rome to tell him just how far he was from the city because the Appian Way had enormous stones every Roman mile (1,480 m or about .9 of a modern mile). These gave the distances to major cities, compass directions and other information. Indeed, the milestone at the Marketplace of Appius still exists. From the unpleasant marshlands the road climbs along the Albani hills toward Rome, descending again as it nears the city. This final part of the Old Appian Way has been preserved as a public park and time seems to recede as we retrace Paul's footsteps.

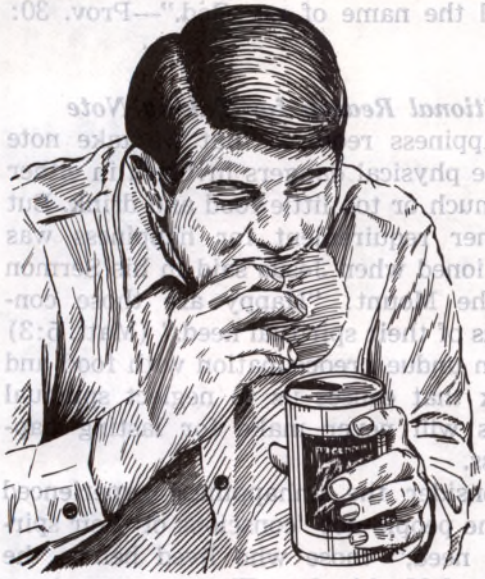
Every so often stretches of the original paving stones can be seen in this section, worn but intact after 2,000 years! Some cypresses and many pine trees border the roadside, conferring on everything an atmosphere of grave serenity. Ruins of red-brick walls can be seen, with marble slabs on which a few Latin words can still be distinguished. Seen, too, are occasional time-worn, broken statues. Still closer to the city are two of the famous catacombs, where early Christians hid in times of persecution. They are outside the city walls as Roman Law required, but Rome is very close now.

Perhaps Paul's Christian brothers pointed out some of the sights and monuments to him, although he was hardly coming to Rome as a tourist! Of course, many of the monuments we see in ruins today were built somewhat after Paul's time. But the great circular tomb of Cecilia Metella, large enough to serve as a fortress (as it did in the Middle Ages), doubtless caught Paul's eye as it catches ours.

Soon Paul and his companions passed through the Porta Campena and entered the city itself. There, just ahead on the left, was the enormous Circus Maximus, a giant racetrack that could hold 250,000 spectators. Here ended (or began) the Appian Way, some 362 miles (583 km) from the seaport of Brundisium. If you visit Rome and wish to retrace Paul's footsteps for yourself, be sure to find the *Old* Appian Way, as the New Appian Way is a busy auto route.

These historical details are not merely interesting for their own sake. They give us good reason to trust the Bible. However, the Bible is a book about the future, as well as the past. If your interest in the Bible has been stimulated, why not consider what it promises for the future? What it has to say is not only reliable but comforting and heartwarming.

DO YOU RECOGNIZE THE MEANING OF WHAT YOU SEE?



Preoccupation with eating and drinking —Is there a danger in this?

EATING and drinking are among life's normal pursuits. Essential? Yes. Enjoyable? Certainly. And yet at times both can cause us problems, generally resulting from either too much or too little.

All of us have seen pictures from some famine-stricken nations of the bloated and emaciated bodies of little children slowly starving to death. But we have also seen evidences of what Dr. Kurt Franke at Germany's University of Göttingen calls one of today's most common ailments in the affluent world: obesity. In the Federal Republic of Germany, for example, every second person and every fourth child is said to be overweight.

Being overweight is more than just a matter of looks; it is a major health hazard. The publication *Tages-Anzeiger* recently warned that "pestilence, war, hunger and death are being followed closely by a fifth apocalyptic rider—superabundance!" It added: "Never before in history have so many eaten so much." But are people taking note?

Along with the enjoyment of food goes the enjoyment of drink. When used in moderation, this can properly include alcoholic beverages. In many countries the consumption of such alcoholic beverages is on the rise. Note the percentage of increase in consumption of them between the late 1950's and the early 1970's in the following countries: New Zealand 13, Canada 17, United Kingdom 20, Sweden 26, United States 32, Ireland 41, Denmark 54, Federal Republic of Germany 61, Netherlands 83.

It is common knowledge that too much alcohol can cause any number of problems for both the drinker and those around him. Excessive drinking damages the liver and the brain and can lead to premature death. *New Scientist* magazine of February 26, 1981, after restating the well-known fact that alcohol kills brain cells, reports on the holes left by those dead cells and states that the brains of chronic alcoholics are less dense than those of nonalcoholics. An increasing number of individuals and groups, including government agencies, are sounding a warning more loudly and clearly than ever before. But are people taking note?

Not according to Mikolai Tolkan, a Polish scientist. Addressing an international congress on alcoholism, he said alcohol consumption in Poland has increased by 35 percent in five years and warned that this worldwide trend, unless halted, might pose a greater threat to mankind than the atomic bomb. The alcohol "bomb is already ticking away and few people notice it," he concluded.

The Dangers of Too Much or Too Little

There is no doubt about it. Everywhere we look we see people very much preoccupied with "eating and drinking," some by choice, others of necessity. What is the chief danger in this? Not in the damage done to physical health—of which people all too often fail to take note, or that they simply ignore—but in the damage done to spiritual health. What do we mean by this?

An abundance of food and drink can make a person smug and overly self-confident. With so much attention directed toward the satisfying of physical cravings, he can become self-centered. Losing sight of spiritual needs, he may even go so far as to deny God, if not in words, at least in actions. The Israelites, before entering the Promised Land, were warned of this danger: "When Jehovah your God will bring you into the land . . . and you shall have eaten and become satisfied, watch out for yourself that you may not forget Jehovah."—Deut. 6:10-12.

On the other hand, people with too little to eat and drink may be forced to spend most of their time simply struggling to exist. Food, necessary for survival, becomes their main concern, crowding out everything else, including spiritual needs.

This is well illustrated by an experiment conducted in the United States in 1945. A group of men were placed on a "starvation diet" for six months. Afterward it was found that the diet had caused them to become indecisive and pessimistic in spirit, had robbed them of initiative, and had left them almost completely devoid of any interest in spiritual matters.

So as regards food and drink, both overindulgence and undue concern about an insufficiency can damage a person's relationship with God. Understandable and still appropriate, then, is the prayer of a man who wanted to please God some 25 centuries ago: "Give me neither poverty nor riches. Let me devour the food prescribed for me, that I may not become satisfied and I actually deny you and say: 'Who is Jehovah?' and that I may not come to poverty and I actually steal and assail the name of my God."—Prov. 30: 8, 9.

Additional Reason for Taking Note

Happiness requires that we take note of the physical dangers involved in either too much or too little food and drink. But another requirement for happiness was mentioned when Jesus said in his Sermon on the Mount: "Happy are those conscious of their spiritual need." (Matt. 5:3) So an undue preoccupation with food and drink that causes us to neglect spiritual needs will never make for lasting happiness.

Consider the unhappiness experienced by the people not "conscious of their spiritual need," those who lived before the flood of Noah's day. They were so busy "eating and drinking" that "they took no note until the flood came and swept them all away."—Matt. 24:38, 39.

Jesus referred to that calamity when his disciples asked him: "What will be the sign of your presence and of the conclusion of the system of things?" In answer, he said: "Just as the days of Noah were, so the presence of the Son of man will be." (Matt. 24:3, 37) The people in Noah's day were so preoccupied with "eating and drinking" and other everyday pursuits that they took no note of Noah's warning about an impending flood. So it would be, Jesus said, in the "last days" at the time of his return.—2 Tim. 3:1.

Everywhere you turn you can see evidence that people today are indeed preoccupied with "eating and drinking," oftentimes to the neglect of their spirituality. A warning message is being delivered, but are people taking note?

More important, are YOU?

Getting Away from It All

How one couple discovered the beauty and solitude of the back country

MY WIFE and I had not seen a soul for almost a day as we hiked down the tallest peak that skirted magnificent Yosemite Valley in the heart of California's Sierra Nevadas. Both of us were in good spirits, yes, exhilarated at having been at the top of Cloud's Rest, a gentle mountain rising almost 10,000 feet (3,050 m) in the crisp clear air.

Admittedly, most persons will not share my enthusiasm for climbing a mountain or hiking a dirt trail. But, for us, having that mountain to ourselves made it all worth while. Only a few days earlier we had been down in the valley waiting in long lines for a campsite, for groceries, for counter service, for the use of shower and bathroom facilities and, at times, even for a place to sit. It was August, the peak season for popular Yosemite Valley in Yosemite National Park—and we were beginning to be reminded of hectic New York city, our home.

Time to Get Out

As much as we enjoyed the amusements, the restaurants, the educational programs and the stunning beauty in this scenic valley, it was time for us to get out.

The next morning we caught the Lee Vining bus that snakes its way slowly up the Tioga Pass Road, the only road that crosses the 1,189-square-mile (3,100-km²) park. We got off at Tenaya Lake, a lake so appealing that I know my wife would have been pleased to camp there. But I gently reminded her of our plans. Basically, we would travel southwest along the rim of Tenaya Canyon,

turn south along famous John Muir Trail and then follow the Merced River into Yosemite Valley.

We were well prepared for our trip. We had down sleeping bags and coats to cope with the cold mountain air. Additionally, we carried a three-day supply of dried foods, a canteen, first-aid equipment, maps and a small stove in our two aluminum frame packs. Locating the Forsyth Pass Trail, we started climbing, following dry, dusty switchbacks that zigzagged up the side of Sunrise Mountain.

Late that afternoon, on a 9,000-foot-(2,740-m-)high plateau between Sunrise and Cloud's Rest, we reached a lovely lake and a delicate meadow surrounded by a forest of pine. This was too inviting for us to pass up. So we set up camp, replenished our water supply at a gentle stream and then cooked a tasty meal of freeze-dried beef Stroganoff.

Finally, for the last hour before sunset, I scoured the surrounding forest until I found what I thought was the very best bough on which to hang our food. Why my concern? The bears in these parts are smart, and I had been outwitted by them before.

Outwitting the Bears

I learned about these bears when I backpacked in Little Yosemite Valley with two of my friends 10 years before. The rangers had told us to hang our food in the trees, but, being inexperienced, we did not think it was worth the effort to hang our food very high.

That night, as the three of us lay in our tents, we were alerted by a soft shuffling sound. What a surprise when we looked out and saw three large black bears with their noses pointed up at the delicacies contained in our packs! One of them scampered up the tree to which the packs were tied. In a moment food was scattered in every direction over a blanket of pine needles. Feuding over their portions in this wild nocturnal picnic, they ripped up every can, package and pack they could get their claws on. The next morning we futilely tried to boil half a potato—the only food the bears left us!

Now, as my wife and I lay under the same star-filled sky, I was hoping I had learned something in the intervening years. This time our packs were empty, unzippered and lying on the ground. Our food was in two nylon sacks suspended 18 feet (5.5 m) in the air by a strong cord on a stout limb. And—to keep us out of the field of action—they were hanging 200 feet (60 m) away from camp.

That night we were awakened with a start. The absolute silence of the forest was shattered by a hungry bear determined to get a free meal. From our camp we could hear the strain of a lower limb bearing his weight as he desperately clawed at the sacks. Edging further out, he stepped too far. The limb snapped. Down came Mr. Bear, landing with a thud. What an agonized growl he gave!

From the noise, one might have thought he had taken the whole tree down with him—certainly our food—and thoughts of my defeat at Little Yosemite flashed through my mind. I felt frustrated. Without food we would have to turn back.

But you should have seen me in the morning. When we went to the tree and discovered the food still hanging there safe and sound, I whooped and hollered and slapped my knee in sheer delight. Both of us danced up and down like children. Breakfast was simple—hot milk, granola, dried fruit and tea—and in fervent prayer we thanked our Creator for it.

The Back Country of Yosemite

And then we hiked up Cloud's Rest. Actually, if you want to rate mountains, Cloud's Rest would be considered easy. The route we took had no cliffs to scale,

no talus to stumble on. Besides, I didn't want to repeat the mistake I had made on our honeymoon only two years earlier.

At that time we had started up the steep switchbacks along the side of Yosemite Falls, one of the highest falls in the world. It was late in the day and I wanted to get to the top before nightfall. Unfortunately, we were so out of shape that by the time we returned to the valley on the following day, our legs were terribly sore. We walked around for the next four days like stiff-legged robots, grimacing in discomfort.

This time it was different. We were standing on top of one of the largest continuous rock slopes in the world, a solid granite face that slanted down 4,500 feet (1,370 m) to the bottom of Tenaya Canyon—and we felt fresh. For the first time we got a bird's-eye view of Yosemite Valley to the west and the rugged High Sierra to the east.

John Muir, the famous naturalist, was instrumental in getting this whole area set aside as a national park in 1890. We could appreciate his description of the park: "The headwaters of the Tuolumne and Merced Rivers, two of the most songful streams in the world; innumerable lakes and waterfalls, and smooth silky lawns; the noblest forests, the loftiest granite domes . . . and snowy mountains soaring into the sky twelve and thirteen thousand feet [3,660 and 3,960 m], arrayed in open flanks and spiry pinnacled groups partially separated by tremendous canyons and amphitheaters; gardens in their sunny brows, avalanches thundering down their long white slopes, cataracts roaring gray and foaming in the crooked rugged gorges, and glaciers in their shadowy recesses."

Regretfully, we had to leave this glorious spot. That evening we hiked into Little Yosemite Valley and slept the soundest sleep we ever had on the trail. Refreshed in the morning, we continued along the John Muir Trail overlooking the "songful" Merced River playing its tune over rocks and boulders and making two spectacular leaps at 594-foot-(181-m-)high Nevada Falls and 317-foot-(97-m-)high Vernal Falls. What a sight to behold!

Our Journey Ended

As we entered Yosemite Valley, we were tired, hungry and sore. But it was worth it! Our bodies had been invigorated by the physical exertion. Our minds had been freed from stress. Our appreciation for our loving Creator, who made this beautiful earth for us, had been heightened.

It was just as John Muir had said so long ago: "Climb the mountains and get their good tidings. Nature's peace will flow into you as sunshine into trees. The winds will blow their own freshness into you and the storms their energy, while cares will drop off like autumn leaves."—*Contributed.*

EXERCISE REDUCES HEART ATTACKS

A survey of middle-aged men over several years revealed that those vigorously exercising had less than half the coronary heart disease than those not exercising had. There are theories as to why this is so, but the evidence is not yet conclusive. The practical conclusion is, vigorous exercise is good for you.

From Our Readers

SMOKING

Your polemics on smoking about turned me off. You sound like those who were going to cure the evils of the world when they got prohibition. Most thinking people realize how that worked out.

D. Y., Illinois

Our appeal was not for a legislative ban but was directed to individual readers for them to consider the evidence and personally decide in their own interests. —ED.

Please send me 10 copies of your "Awake!" on smoking. The article was very good and it has helped me to quit smoking. I'd like to share it with some smoking friends. I am not interested in being visited or becoming a member, as I'm affiliated with another religious body; but I do appreciate what you're doing. Keep up the good work.

M. W., North Carolina

I have just read your article on "Is Smoking Here to Stay?" As a Christian trying to 'break free' of this, I ask you to send me the information mentioned in this article please.

M. A., England

FAMILY PROBLEMS

I am a single parent (divorced not by my own choice). I'd like to say this: Divorce is not the recommended way. However, the innocent victims need not feel that the world ends there. It doesn't. Oftentimes a new and better life begins. It did with me. To be honest, I am much happier now and my children seem happier. My daughter's grades have improved. I'm sure we all know of single-parent homes that are far happier and more successful than many two-parent homes. It really depends. Life is what you make it.

Anonymous, Ohio

As a father of four children I just had to drop you this line of thanks. I have just read "Awake!" of April 8 on children and parents. As a court reporter employed by a family court, I have heard and written millions of words dealing with the full gamut of family problems, and particularly with children. I have never read anything so touching to the heart. Also I can see the need for an immediate adjustment in my own household.

Anonymous, New York

HELP FOR STUDENTS

As a high school student I appreciated very much "Awake!", which helped me to prepare various essay topics for school. These interested many a teacher and student. Now as I am a university student the magazines are a priceless source of information for all my studies.

E. P., Australia

I am writing to thank you for the articles you publish. They have proved useful to me for research and developing of my school assignments. I have found them effective in all fields, in geography, history, science, etc. I am 12 years old.

L. L., Italy

CROSSWORD PUZZLES

We have found the crossword puzzles especially helpful in teaching the children. They have their own Bibles and, with questions phrased to their understanding, thoroughly enjoy finding the books required to give the answers. This is teaching them to find their way around in God's Word.

B. P., England

I love the crossword puzzles. I have never seen Bible study so interesting.

P. W., Illinois

Thank you for the crossword puzzles. They are interesting and relaxing, and you learn a lot about details in the Bible.

L. K., Australia

Watching the World

Drug Use Part of College Life

◈ A team of Harvard Medical School researchers, reporting on surveys they have made in different years about drug use among college students, now say: "It appears that drug use has merged even further with 'normal' college life in the last nine years." The study, reported in *The Archives of General Psychiatry*, revealed an "astonishing" increase in the use of cocaine among the students. Drug users were found to be more sexually active than nonusers and were also more likely to have consulted with a psychiatrist while in college.

Drugs in the Elementary Schools

◈ "The latest survey," according to a report in Italy's *Domenica del Corriere*, "shows that the age of youths who use drugs and sell them among their friends continues to get dangerously lower all the time." "Some drugs," the magazine continues, "are already in elementary schools" and "the age of sellers . . . up until now is twelve."

"Golden" Smiles

◈ German dentists used 28 tons of gold in 1979, up from only eight tons 10 years before. According to the German magazine *Medikament und Meinung*, about a third of the entire amount of dental gold used in the world is to be found behind German smiles. The world increase in dental gold consumption, from 60 tons in 1969 to 86.5 tons in 1980, has been almost exclusively due to the increased use by German dentists.

'Save Tadpoles or Unborn Kids'?

◈ The U.S. Health and Human Services Secretary Richard Schweiker recently was asked whether the Reagan Administration's promise to "get Government off the backs of the people" contradicted its belief that abortion should be prohibited. Appearing on the NBC news program "Meet the Press," he replied: "I think where actually I see the contradiction is that we have a proposal that in essence says we are going to save the baby seals, we are going to save the baby whales, we are even going to save the snail darters and stop a dam, but we won't save the unborn child. I have trouble understanding why we can get all wrought up about tadpoles and not unborn kids."

"Great Readers" in Russia

◈ Writing in the quarterly *The Media Reporter* of Derby, England, Philip Radcliffe tells of Russians' being "great readers." He adds: "There are more than 8,000 national and republic newspapers, printed in 56 languages, and nearly 5,000 magazines. . . . *Pravda*, with the biggest circulation in the world, has a daily print run of 11 million copies and an estimated readership of 50 million. . . . Even the second daily paper, *Izvestia*, published by the Presidium of the Supreme Soviet (as distinct from the Party), has a staggering 9 million circulation."

Near-Death from Selenium Lack

◈ A two-year-old girl living on Long Island, New York, almost died because her diet rarely varied. She reportedly ate grits, sausage and beans in the morning, hot dogs and beans for the noon meal and pork and beans and rice for the evening meal. When the girl developed an enlarged heart and water on the lungs, her guardian took her to the hospital. Doctors thought that a virus was causing her illness, but she failed to respond to therapy. Then one doctor remembered a three-year study made by Chinese researchers who found that a lack of the mineral selenium in a person's diet results in such symptoms and could cause death. Tests were run on the girl, and these disclosed that she had the lowest levels of selenium ever found in a child. She was given selenium tablets and within a month regained her health. Selenium is found naturally in foods the girl was not eating, such as eggs, tuna fish, wheat germ, bran, broccoli, cabbage, tomatoes and onions.

Duck Grounded for an Operation

◈ A wild duck living on a golf course in Nevada (U.S.) was found to have a three-foot arrow piercing its breast. Despite this handicap, the mallard was able to swim and fly. But the Humane Society decided that the duck, called Donna, had to be grounded so she could have an operation to remove the arrow. Members of

the Humane Society tried for a month to capture Donna, but the duck flew away from its well-meaning pursuers. Finally, they put out bread laced with a tranquilizer and thus captured the duck. Then she was transported by helicopter to a veterinary clinic in Las Vegas for the operation. After convalescence the bird was returned to her golf-course home, where she can swim and fly again to her heart's content.

Italy "Through Polish Glasses"?

◈ The Roman Catholic Church recently backed a proposal for repeal of Italy's liberal abortion law, Pope John Paul II taking personal charge and speaking out forcefully against the abortion law. But when the votes were counted, Italians, by a margin of more than two to one, rejected the proposal for repeal. The Socialist Party leader, Bettino Craxi, was one of the politicians who spoke out openly against the pope, accusing him of seeing Italy "through Polish glasses." The politician declared that "the hold that the church has on the Polish people simply does not exist in Italy."

Effects of Nuclear Bomb Tests

◈ After World War II the U.S. moved the people of Enewetak atoll and Bikini atoll off the islands so that they could be used for nuclear bomb tests. Almost all the 700 Enewetak people have gone back to the atoll in the Marshall Islands. The leaders of the Enewetak atoll have appealed to the U.N. to continue their trusteeship arrangement with the U.S. after the rest of Micronesia is granted self-rule. The reason? They cited "special problems and special needs" as a result of the bomb tests. They say that until new coconut, breadfruit and pandanus trees attain maturity, the islanders are virtually dependent on food provided by the U.S. Though the U.S. has spent $100 million to restore 30 of the 40 islands for living and agriculture, one of them, Runit, is still so contaminated with radioactivity that it may remain off limits indefinitely.

Petitioning the U.N. also were the people of Bikini atoll. They are asking the Trusteeship Council to help persuade the U.S. to conduct a new survey of radiation dangers on the islands. "The Bikinians," said the New York *Times*, "have been told that the main island will be off-limits for 30 to 60 years because of residual radioactivity and that Eneu will be off-limits for 20 to 25 years."

Superabundance on a Supertanker

◈ Quail meat has long been appreciated as a delicacy. But it has long been known that under certain circumstances eating the meat can be dangerous, even fatal. The Swiss newspaper *Die Weltwoche* describes an experience that the crew of a supertanker had when a number of migratory quails sought shelter from a storm on their ship. The birds pushed their way through the windows and hatches into the engine rooms and cabins. With such an abundance, the crew naturally ate some of the birds. Within 12 hours most crew members had difficulties breathing and speaking, and their limbs became paralyzed. Three seamen died. The ship's doctor diagnosed "poisoning," although the meat had been eaten when still fresh.

How had it become toxic? Professor Louis E. Grivette of the University of California offered this explanation: "Whenever quails on their way from Central Africa to Europe are suddenly faced with severe danger, fear creates a stress in their bodies that in turn produces body toxins. Thus the stress does not kill the frightened animal, but does kill those who take advantage of their victim's stressful situation by slaughtering it and then consuming its flesh."

The Priesthood in Austria

◈ "For years the Church has been struggling with the problem of recruiting new priests," states the Vienna newspaper *Kurier*. Because of the shortage of priests, Christmas Mass could not be celebrated last year in a number of Austrian churches. Twenty years ago, 170 young Austrians were annually ordained as priests. Last year only 59 deacons proceeded with their ordination ceremonies. Asked by a *Kurier* reporter for the reasons behind this shortage, Bishop Kuntner admitted that "the Church has made mistakes, too." He said: "Oftentimes the examples that would stimulate young people to the priesthood have been missing." The newspaper article concludes by saying: "Besides the lack of newcomers there is the problem of advanced age. Every third priest in Austria is over 60."

Tight Jeans Cripple Youth

◈ A Danish medical magazine recently told about an 18-year-old youth who was thrown into a bathtub during a party. Afterward, he went to sleep in his wet, tight blue jeans. When he woke up after 11 hours, he found that blood strangulation caused by the shrunken jeans had damaged his right leg muscles, crippling him for life. The doctor writing the article cautioned youths against buying jeans that are too tight and especially warned against shrinking them to be skin-tight by wearing them wet.

China Harnesses the Yangtze

◈ The building of the Gezhou Dam, at Yichang in the People's Republic of China, is the first attempt to harness the energy of the Yangtze, one of the world's greatest rivers. Started in late 1970, the dam is one and a half miles (2.4 km) across and has seven water-driven generators in-

stalled, ready to produce electricity. When the dam is completed about four years from now, it will have 21 generators, with a generating capacity of 2.7 million kilowatts. The $2.2-billion project not only will provide needed electricity but also will aid in flood control.

International Bargain Hunters

◈ American motorists seeking to buy gasoline in Canada at a saving of about 40c (U.S.) a gallon have contributed to a doubling of traffic across the Peace Bridge at Buffalo, New York. Revenues for the bridge rose from $2.3 million in 1970 to almost $5.6 million last year, with about 8.6 million vehicles crossing the bridge.

Bread Among Rubbish

◈ According to the president of the Breadmakers Union, an estimated 14,000 quintals (3 million pounds) of bread are thrown into the rubbish can every day in Italy—equivalent to about 510 thousand million lire ($440,000,000, U.S.) per year. In an interview published in *La Stampa,* he said that he based his figure on investigations made in two cities, Milan and Bari, where every day 450 and 200 quintals (100,000 and 44,000 pounds) of bread, respectively, are found in the rubbish. Some believe that low prices are probably one cause of waste by so many consumers.

'Battle Against Blindness'

◈ In a report on a meeting held in Italy, the *Gazzetta del Sud* said that there are 200 blind persons for every 100,000 inhabitants in that country. In the U.S. and northern European countries, the number of blind persons ranges from 50 to 80 for 100,000 inhabitants. But the number rises to 1,000 in Pakistan, 2,500 in Nigeria and 3,000 in Ghana. Despite modern methods for treating eye diseases, the battle against blindness was defined by the daily as a "hard fight."

Deadly Environment

◈ A British scientific study has added its voice to those who report that lung cancer can strike nonsmokers who must live in the environment of heavy smokers. The report showed that out of 346 women who died with lung cancer, 174 were nonsmokers, but they lived with habitual smokers or they were regularly in the environment of such smokers. The death rate among women with lung cancer doubled among those married to men who smoked 20 or more cigarettes daily.

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