

Awake!

May 22, 1989

IS LOSING WEIGHT A LOSING BATTLE?



WEIGH CAREFULLY THESE QUESTIONS

✓ DO YOU NEED TO LOSE WEIGHT?

✓ DO YOU WANT TO LOSE IT?

✓ WILL YOU SHUN JUNK FOOD?

✓ WILL YOU COUNT CALORIES?

✓ WILL YOU EXERCISE REGULARLY?

✓ WILL YOUR METABOLISM HELP?

✓ ARE YOUR GLANDS TO BLAME?

✓ ARE YOUR FAT CELLS TOO BIG?

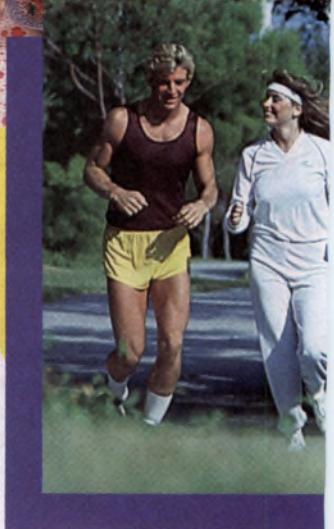
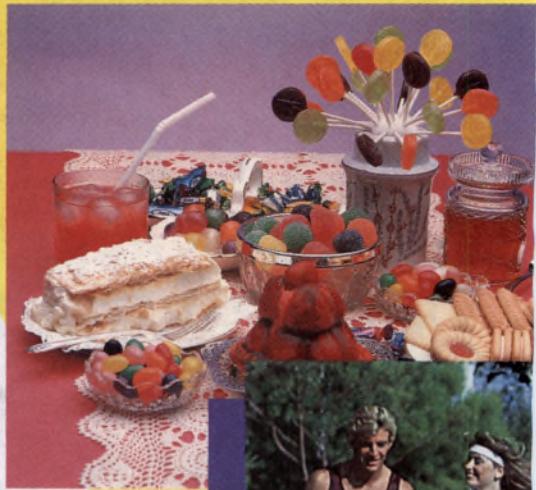
✓ ARE THEY TOO NUMEROUS?

✓ ARE YOUR GENES AT FAULT?

✓ IS YOUR GOAL REALISTIC?

✓ WILL THE WEIGHT LOST STAY LOST?

**THE BOTTOM LINE:
HOW STRONG ARE YOUR
WILLPOWER AND YOUR
STAYING POWER?**



IS LOSING WEIGHT A LOSING BATTLE?

**WINNING THIS FIGHT IS NOT AS SIMPLE
AS THIN PEOPLE THINK!**

THIS is a war waged on many fronts. Fasting sheds the unwanted pounds in a hurry. Liquid diets melt them off at a goodly clip. Runners jog them off. Walkers do it at a slower pace. Calorie-counters keep tabs on their food intake. Some resort to more drastic measures. Jaws have been wired shut to thwart weak wills when faced with food. Operations have bypassed certain areas of the digestive tract, have stapled stomachs, and have performed procedures that suck out globs of fat from fat deposits. With all these options, victory must be imminent.

But not so fast! Fat cells once defeated come storming back. Pounds lost return, often with reinforcements. The battle rages back and forth, as temporary successes are followed by disheartening failures. The struggle drags on, discouragement sets in, and weary dieters are ready to capitulate. They shouldn't. The way is long and the road is rough, but victory lies

ahead for the hardy ones who persevere. So gird up the loins of your mind and remember, the harder the fight, the sweeter the victory. At the outset of your battle against fat, you must also brace up your mind to maintain a sense of self-respect and self-worth. You may have to endure the social slights and slurs of a society obsessed with thinness.

You must resist unthinking hostesses who urge you to eat what you shouldn't. You must survive the prejudices of cruel critics who brand you as gluttonous.* The former would defeat you with kindness; the latter, prejudge you on outward appearances.

You must ignore the simplistic proclamations of the uninformed: "If you didn't overeat, you wouldn't be overweight!" They make it sound simple, but it is very complex. It is true that if you do not eat more calories than

* For a Biblical discussion on gluttony, please see *The Watchtower*, May 1, 1986, page 31.

you burn up, you will not gain weight. In many cases, however, not all calories eaten are burned up. For various reasons, many of them are stored as fat in fat cells. So for the over-

INSTEAD OF BEING LAZY, FAT CELLS IN OVERWEIGHT PERSONS WORK OVERTIME

weight, it can at times be a lonely battle, except for supportive friends aware of the odds against which they struggle. And those odds may be formidable indeed.

Preliminary to plunging into the complexities of the struggle, however, there is this question to be weighed: Do you need to lose weight? In some countries thinness has become a fetish. Some become thin to the point of being undernourished, or even go to the extreme of anorexia nervosa or bulimia. Rather than weight alone being the basis for judgment, the percentage of fat in the body is considered by scientists to be a better guide. They define overweight as obesity when in men 20 to 25 percent of body weight is fat and in women when 25 to 30 percent is fat.

WHY "AWAKE!" IS PUBLISHED

"AWAKE!" is for the enlightenment of the entire family. It shows how to cope with today's problems. It reports the news, tells about people in many lands, examines religion and science. But it does more. It probes beneath the surface and points to the real meaning behind current events, yet it always stays politically neutral and does not exalt one race above another.

Most importantly, this magazine builds confidence in the Creator's promise of a peaceful and secure new world before the generation that saw the events of 1914 passes away.

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Certainly, specific weights given in tables based on height and weight alone are inadequate. As one researcher says: "What the tables don't tell you, though, is that two people of the same weight and height can differ greatly in their degree of obesity and overall physical condition. Lean tissue and muscle weigh more per volume than fat, so weight alone is not a very good measure of health or fitness." A more reliable guide—though still imperfect—are those tables that consider age, sex, and body type, and give a range of acceptable weights, such as the one on page 7.

Many persons assume that fat cells (called adipocytes) are very lazy things, just lying around in the body taking up space—far too much space! Fat tissue (called adipose tissue) is more than a storage depot for triglycerides (fats). About 95 percent of adipose tissue is nonliving fat, but the remaining 5 percent is divided between structural material, blood and blood vessels, and living cells active in the body's metabolism. These cells can be very greedy, grabbing on to and converting to fat the dietary nutrients from blood circulating through the capillaries that intersperse adipose tissue. Certain hormones promote either the synthesis of fat or its release as fatty acids into the blood to meet the body's energy needs. Instead of being lazy, to the despair of some people, their fat cells work overtime!

In the past it was thought that once estab-

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lished in the body, fat cells did not increase in number, only in size. Later research has proved otherwise. As one scientific source says: "Enlargement of the storage capacity of adipose tissue is accomplished first by enlargement of the adipocyte contents of storage fat, triglyceride, and later on, when available adipocytes are filled to full capacity, by the formation of new fat cells." When nearly empty, the adipocytes are very small, but as they add fat, they can increase their diameters tenfold, which means an increase in volume by a factor of about one thousand.

There are certain fat depots in the body where fat tends to collect. In men the waistline is one. In women it is the hips and thighs. Such persons may shed fat, but these locations are the last to release theirs. Researchers have discovered that fat cells have on their surfaces small molecules called alpha and beta receptors. Alpha receptors stimulate fat accumulation; beta receptors promote fat breakdown. Those favoring fat accumulation predominate on the fat cells of the hips and thighs of women and on the abdomen of men. One woman lost 15 percent of her body fat but virtually none from her hips and thighs. A man cut his weight drastically but kept his paunch.

Counting calories is not the simple solution to losing weight that many think. Calories are not equal. Eat 100 calories in carbohydrates and you may store 77 of them as body fat—23

are burned in digesting the carbohydrates. But consume 100 calories in a pat of butter and 97 are stored as fat—only three are consumed for digesting. The reason: Dietary fat is already chemically close to body fat, so it is stored as such much more easily. Counting calories is only part of the story. The source of those calories also counts. Calorie for calorie, fat foods are more fattening and less nourishing than carbohydrates. In one study, men overfed on a high-carbohydrate diet for seven months gained 30 pounds, but men overfed on a high-fat diet gained 30 pounds in three months.

Liquid diets shed weight more rapidly, which frequently causes complications. During the 1970's liquid-protein diets were promoted, and by the end of 1977 approximately 60 deaths were attributed to them. Ventricular arrhythmias, that is, rapid and irregular beating of the

COULD DIETING INHIBIT LATER WEIGHT LOSS?

heart's ventricle chambers, were believed to be the immediate cause of many of these deaths. Current liquid diets have been improved by the addition of not only protein but also

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carbohydrates, fats, vitamins, and minerals. Even so, such low-energy diets with their fast weight losses still have their drawbacks.

The drastic calorie reduction of diets producing fast weight losses slows body metabolism—the decline begins within 24 hours, and

THE HEALTH HAZARDS ARE SOBERING INDEED

in two weeks the metabolic slowdown can be as much as 20 percent. One doctor questioned about low-calorie liquid diets commented on this: "Your metabolism will slow to a crawl on so few calories, and you'll find yourself irritable and fatigued. Also, up to 70% of your long-term weight loss will be muscle, not fat." Dieters are wanting to lose fat, not muscle. Muscle tissue is the body's best calorie burner. Losing it slows your basal metabolic rate—the measure of energy used to maintain routine bodily functions, such as breathing and cell repair. This accounts for approximately 60 to 75 percent of energy consumed by the body.

This metabolic decline is why dieters often stop losing weight after a few weeks of severe dieting. One woman, who since she was 16 had kept her weight down by dieting, gained 25 pounds with the birth of her first child but quickly lost it, then gained 50 pounds after the birth of her second child and could not lose it. She reports: "At one point I went to a weight-loss clinic where I was cut to 500 calories a day. I lost ten pounds the first month, two the second month and nothing the next two months despite faithfully following the program. When my calorie intake was raised to 800 per day, I steadily gained 2 pounds per

week till I had gained back the 12 I had so painfully lost. So discouraging!"

In addition to a slowed-down metabolism, an enzyme, lipoprotein lipase, that regulates fat storage, may become more active in storing fat after crash dieting. For both these reasons, some people regain lost weight when normal eating is resumed. In fact, the majority regain the weight they lost—95 percent for the very obese and 66 percent overall. The weight regained, however, is mostly fat, not lost muscle, which means a reduced metabolism that encourages more fat storage.

One researcher noticed that those who had lost weight on previous diets and regained it had greater trouble losing it again on later diets. "Could dieting inhibit later weight loss?" he wondered. Tests were conducted on obese rats. On their first diet, it took 21 days to lose the excess weight and, after going off the diet, 45 days to regain it. On a second diet, it took 46 days to lose it and only 14 days to regain it—twice as long to lose it and three times as fast to put it back on!

Does it work the same with people? On low-calorie diets, 111 patients lost an average of 3.1 pounds a week, but on the same diet a second time lost only 2.1 pounds per week. Follow-up tests with two other groups of people verified those results.

Many of the experts call obesity a disease, say it is in the genes, is inherited, and that the body has a set point for weight that may destined you to fatness. But not all scientists agree on the theories on obesity. The *Annals of the New York Academy of Sciences* says that overweight itself, whatever its original cause, may be responsible for the changes in body chemistry: "The obese state, once established, may be stabilized by secondary metabolic changes that the obesity itself generates."

Annals also questions the set point theory: "This *Annal* provides little evidence in support

of either hypothesis." Glandular problems are cited as causes of overweight, especially the thyroid, which has a major role in controlling metabolism. The point is raised by some, however, that its failure might be caused by overeating. Dr. Riggle of Texas comments on this: "The thyroid governs metabolism, as well as the pituitary. But we have to remember that people who get into poor nutritional habits cause these glands not to get the nutrients they need to manufacture their products. So the glandular problems can start with the dietary indiscretions."

Overeating is the simple reason for obesity that so many people, including researchers on obesity, associate with it: "For most obese people, however, the accumulation of excess weight and adipose tissue most likely signifies a prolonged, and often, insidious process: excessive consumption of calories, during a sufficient number of days, above and beyond those used for muscular or metabolic work." (*Annals of the New York Academy of Sciences*, 1987, page 343) The health hazards they thereby lay themselves open to are sobering indeed:

"Obesity is associated with a number of health hazards. It may impair both cardiac and pulmonary function, modify endocrine function, and cause emotional problems. Hypertension, impaired glucose tolerance, and hypercholesterolemia are more common in overweight individuals than in individuals of

HEIGHT AND WEIGHT TABLES

Height		Weight		
ft	in	Small Frame	Medium Frame	Large Frame
MEN				
5	2	128-134	131-141	138-150
5	3	130-136	133-143	140-153
5	4	132-138	135-145	142-156
5	5	134-140	137-148	144-160
5	6	136-142	139-151	146-164
5	7	138-145	142-154	149-168
5	8	140-148	145-157	152-172
5	9	142-151	148-160	155-176
5	10	144-154	151-163	158-180
5	11	146-157	154-166	161-184
6	0	149-160	157-170	164-188
6	1	152-164	160-174	168-192
6	2	155-168	164-178	172-197
6	3	158-172	167-182	176-202
6	4	162-176	171-187	181-207
WOMEN				
4	10	102-111	109-121	118-131
4	11	103-113	111-123	120-134
5	0	104-115	113-126	122-137
5	1	106-118	115-129	125-140
5	2	108-121	118-132	128-143
5	3	111-124	121-135	131-147
5	4	114-127	124-138	134-151
5	5	117-130	127-141	137-155
5	6	120-133	130-144	140-159
5	7	123-136	133-147	143-163
5	8	126-139	136-150	146-167
5	9	129-142	139-153	149-170
5	10	132-145	142-156	152-173
5	11	135-148	145-159	155-176
6	0	138-151	148-162	158-179

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normal weight. Thus, it is not surprising that obesity may contribute to morbidity [disease] and mortality in individuals with hypertension, stroke, type II or non-insulin-dependent diabetes mellitus, some types of cancer, and gallbladder disease. Over the long term, obesity is also considered an independent risk factor for atherosclerotic heart disease."—*Journal of the American Medical Association*, November 4, 1988, page 2547.

Sounds ominous, doesn't it? And not just because of the big words. Obviously, losing weight is a battle that needs winning. Are there ways that will help you gain the victory?

FOUR WAYS TO WIN

**THE RIGHT FOOD,
AT THE RIGHT TIME,
IN THE RIGHT AMOUNT,
WITH THE RIGHT EXERCISE**

DO NOT hate your fat cells. They are wonderful. They are designed for an important function. They make fat from sugar and fatty acids. If they need more room for storage space, they expand. If they need still more, they make new cells and fill them with fat. They are marvels at storing energy in the form of fat. It's their specialty. In one pound they can store 3,500 calories, though the liver can pack only 250 calories in a pound of its energy-storage medium, glycogen.

Fat cells receive and obey signals. They cushion vital organs. They release their energy upon demand, supplying it as fuel for the body's working cells. At times they receive emergency signals and spring into action. When sent life-threatening messages, they take lifesaving measures. They start hoarding their fat, holding it in reserve for the impending crisis.

As an international magazine, *Awake!* deals with problems that prevail in various parts of the world. In dealing with health and medical matters, we do not endorse or recommend specific therapies.

It is now clear that fat plays an important, though incompletely understood role, in the body's immune system. Fat cells can receive a false message and misinterpret it as a crisis; a crash diet may send fat cells the same message as would famine or starvation. Instead of fat breaking down, it is actually conserved, curtailing the release of calories to a trickle. But the fat cells have no way of knowing the difference. They react as they were designed to react. They hoard their energy for what they foresee as a future and more crucial need than the present. *Parents* magazine for March 1987 offers a possible explanation: "The more often you diet—the more frequently your body senses you're gearing up for a famine—the more resistant the fat cells become to releasing their precious commodity."

The body intervenes to cope with the current crisis by turning muscle into glucose—the brain must have its glucose or the whole organism will close shop! But you do not want to lose muscle; you want to lose fat. Crash diets are not the winning way. Then what is? The winning ways, plural, are: the right food, at the right time, in the right amount, with the right kind of exercise—and the right mental attitude. The dieter himself must be in the driver's seat. Whether you reach your goal or not is up to you.

The Right Food

Foods high in calories and low in nutrients are not the right foods for weight reduction. Fats and simple sugars are loaded with calories but empty of nourishment. The right foods for both weight control and nourishment are the more complex carbohydrates, fruits and vegetables; the preferable meats are fish and fowl.

"Another basic approach to weight loss," we are told by *The Encyclopedia of Common Diseases*, "should be to eliminate everything

from your diet that is not a whole, nutritious, non-processed, natural food. In addition to food energy . . . your body constantly needs protein, fats, minerals and vitamins in optimum amounts to participate in body processes and to repair and renew body cells. When you eat whole foods [nonprocessed food complexes], you can be pretty confident that you're getting necessary nutrients and not 'empty' calories."

The Right Time

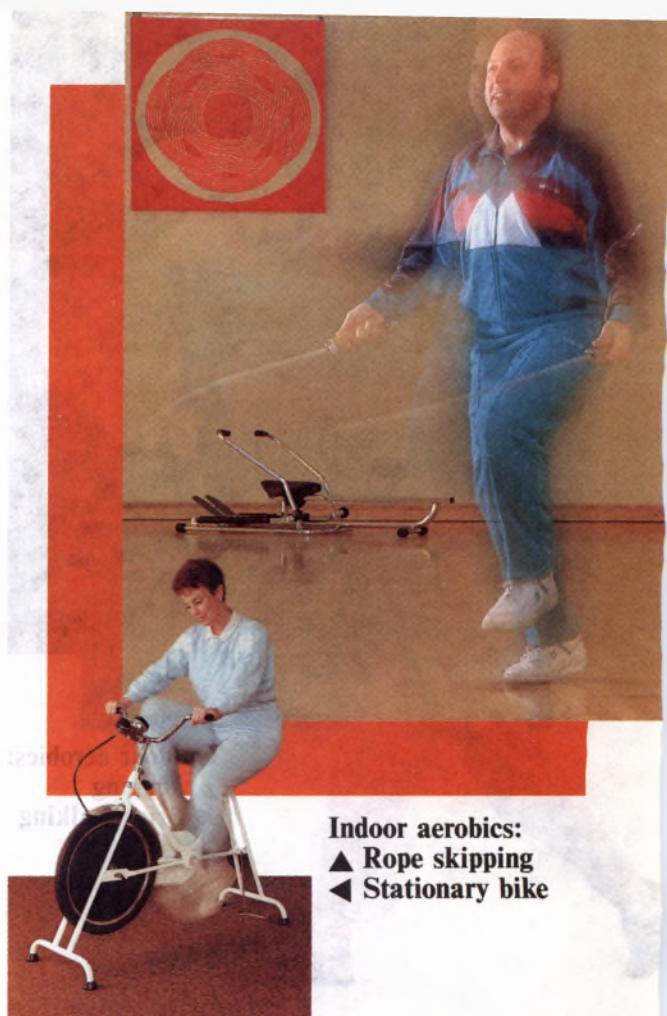
The right time is not while watching television. The incessant nibbling goes on for hours, perhaps consisting of greasy potato chips or French fries, cookies or desserts loaded with sugar, with uncounted empty calories mounting into the hundreds—so hard to stop the snacking since fats and salt add flavor to food and sugar delights our sweet tooth!

Some nutritionists are now "coming around to the conviction that the body has less tendency to accumulate fat deposits if meals are eaten more frequently and served in smaller portions—without a reduction in the daily food intake. They have also found that the meal which is most important and should therefore make the largest caloric contribution to a person's day is breakfast."

The Right Amount

Eat a variety and eat enough. You have learned what will happen if you panic the fat cells by stingy eating! On a weight-loss experiment, rats were given only one meal a day. During the study, their enzymes responsible for depositing fat increased tenfold. The report said: "It was as if their bodies were saying, 'The minute more food comes along, I'm ready to lay down extra fat just in case this stress happens to me again!'"

So "if you *have* to diet, don't make the mistake of fasting or eating just one meal a day



Indoor aerobics:
▲ Rope skipping
◀ Stationary bike

(essentially a 23-hour fast)." Be content to lose slowly, a pound or even a half pound a week. You took a long time to put the fat on; give your body time to take it off. So eat enough to keep your fat cells relaxed and even willing to contribute a few of their own calories to the cause. But don't get gluttonous. Enough is enough!

And with the passage of time, less is enough. As we get older, muscle cells decline and fat cells take their place. Since the lean body mass requires the largest portion of energy, with its decline energy needs decline and metabolism slows down. If food intake does not decline accordingly, fat accumulates. And



Outdoor aerobics:
▲ Jogging
◀ Brisk walking

if older people exercise less—as they usually do—still more food goes to fat. But one researcher says, “You can exercise the intramuscular fat away.” And remember, a good dietary effort can be nullified by binging from time to time.

The Right Exercise

Scientist Covert Bailey says in his book *Fit or Fat?: The ultimate cure for obesity is exercise!* . . . It is a simple fact that those who exercise aerobically on a regular schedule do not get fat. If I were offering a pill to decrease the tendency of the body to make fat, fat people would be lining up to buy it. I am offering

such a pill; it takes just 12 minutes a day to swallow it!” Most data, however, shows that at least 20 minutes is required before aerobic benefits occur.

The exercise Bailey has in mind is aerobics—sustained movement that gets the heart to pump at a fast rate, thereby supplying copious amounts of oxygen to the body for burning fat. Typical exercises in this category are jogging, rope skipping, bicycling, and brisk walking. Before undertaking such an exercise program, however, it is advisable to consult a doctor for direction. Exercise is prescribed by most researchers in weight reduction, as the following statements show.

The slowed metabolic rate “that normally occurs when individuals are on low-energy diets may be prevented or reduced by incorporating physical activity into the program.”—*The Journal of the American Medical Association*.

“The consensus among weight-loss specialists is that a regular routine of exercise is one key [a major one] to weight reduction and maintenance. A good cardiovascular workout increases the body’s resting metabolism for as long as fifteen hours afterward, which means more calories will be burned even after you stop.”—*Parents magazine*.

“In any effective weight control program, exercise is essential. Regularity of exercise is more important than intensity.”—*Conn’s Current Therapy*.

“Exercise changes us. It increases the metabolic rate, increases the amount of muscle, raises the level of calorie-consuming enzymes inside the muscle, and increases the burning of fats. . . . It can also be shown that physically fit people have slightly elevated metabolism. Even when they are at rest fit people burn more calories than fat people do.”—*Fit or Fat?*

After warning that excess weight is a killer because of heart disease and high blood pressure, the good news: "One comforting fact: the damaging effect of overweight is reversible when the weight is trimmed," says *The Encyclopedia of Common Diseases*.

"The sad thing," Bailey says, "about the grossly obese people who often claim they would do anything, absolutely anything, to lose weight is that they refuse to do the one thing that will do them some good. They refuse real exercise."

Little wonder fat is so pervasive when we realize that the body can make fat out of protein, out of carbohydrate, and out of dietary fat. "Almost everything you eat," Bailey says, "if it can be digested at all, can be converted to fat." Fast-weight-loss diets change body chemistry so that "you have a fat person's chemistry. Your tendency to get fat is greater than when you started!"

A certain set of enzymes is needed for the burning of fats. If you do not have these fat-burning enzymes, "you are going to get fat. Enzymes will increase only if you stimulate the DNA by exercise and if you eat enough that there will be amino acids available for biosynthesis," says Bailey.

At times muscles need sudden bursts of energy, increasing the demand fiftyfold in a split second. To get it, they must have enzymes capable of metabolizing the energy sources. Only in muscle cells are such enzymes to be found—special enzymes with this capacity to burn calories so fast. Ninety percent of all the calories burned in the body are burned in muscles. These enzymes are found in the mitochondria scattered throughout muscle cells, and during exercise they promote the burning of fats in muscle tissue to supply energy.

Concerning these enzymes, *Fit or Fat?* says: "It has been shown repeatedly that

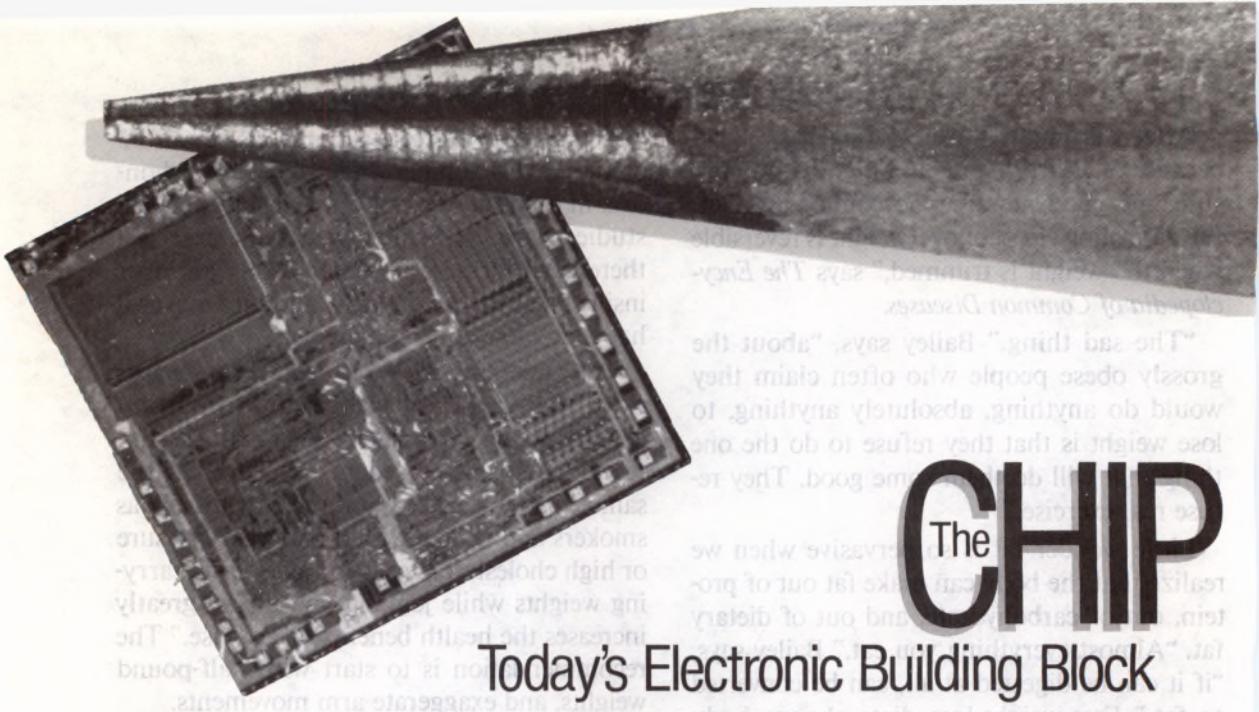
steady aerobic exercise actually causes an increase in the number and size of mitochondria in each muscle cell. Further biochemical studies have confirmed that, with exercise, there is an increase in metabolizing enzymes inside those mitochondria." Aerobics makes it happen; without it fat happens.

The December 15, 1988, *Boardroom Reports* extols the virtues of exercise: "Physical inactivity doubles the risk of heart attack, and researchers classify sedentary people in the same high-risk category for heart attacks as smokers and people with high blood pressure or high cholesterol levels." It adds that "carrying weights while jogging or walking greatly increases the health benefits of exercise." The recommendation is to start with half-pound weights, and exaggerate arm movements.

Spot the triggers that start you eating when you shouldn't. Know the excuses you use to weaken your good resolves. Say no to them immediately! Reject them angrily!

Develop the will to win! Know what you have to do, and do it! Eat the right things in the right amounts and trust your body to put them to the right use. The body is very adaptable. It adapts to the rare atmosphere of mountain heights by making more red blood cells to carry oxygen—but it takes time. It adapts to exposure to a hot sun by adding more melanin to the skin to protect from ultraviolet rays—but it takes time. And it will adapt to sustained exercise by making the enzymes needed to burn more fats for energy—but it takes time.

So be patient. It took time to gain weight; give yourself time to lose it. Move toward your goal step-by-step. Small daily successes in eating and exercising turn what was first a chore into a habit, and soon the flywheel of habit will propel you smoothly along to your image of the new you! Win the war, lose the fat, cherish the victory!



The CHIP

Today's Electronic Building Block

THE digital coffee machine that perks your morning brew, the pocket calculator that saves you a lot of pencil pushing, the multicolored displays on the dashboards of new automobiles—all of these have one thing in common: They have been made possible by the use of waferlike silicon chips not much larger than a baby's thumbnail.

These chips are also found in many other things you may own—watches, TVs, radios, telephones, appliances, and some tools. From the common everyday things used in the home to top-secret military applications, this tiny gem of an electronic marvel plays a major role in transforming the way people around the world live and work. But just what is a silicon chip? How did it come about? And how has it found its way into your everyday life?

What Is a Chip?

A silicon chip is basically a collection of miniature electronic circuits. You might compare an electronic circuit to a sentence in this

article. Every sentence is made up of standard components like nouns, verbs, and adjectives. By arranging these components in different ways, sentences may be put together as statements, questions, even poetry. And by combining sentences in a logical manner, we have conversation and writing.

Electronic circuits are very similar. By arranging standard electronic components—transistors, diodes, resistors, and the like—in different ways, electronic circuits that perform many functions can be developed. Then, thousands of these circuits can be combined to perform all sorts of useful electronic processes. This is so, at least in theory.

In practice, however, it is an enormous task to connect hundreds of thousands of electronic components, not to mention the space they take up. That was precisely the obstacle that faced scientists back in the late 1940's as they assembled the first generation of computers. One such computer in Philadelphia, known as ENIAC (Electronic Numerical Integrator and Calculator), occupied 1,500 square feet of floor space, weighed

about 30 tons, and contained about 19,000 vacuum tubes! This monster required as much energy to operate as 1,300 100-watt light bulbs. Its appetite for electricity gave rise to amusing stories. One claimed that when it was turned on, all the lights in West Philadelphia would dim.

For all their bulk, the capability of ENIAC and its peers was absolutely puny compared with that of the present generation of computers. While a desktop computer today can perform millions of operations a second, ENIAC trudged along at about 5,000 additions or just 300 multiplications per second. And while computers today, costing only a few hundred dollars, may have enough internal memory to store 100,000 numbers or more, EDVAC, another early giant, could store only 1,024. What happened to make today's computers so much more powerful?

In the early 1960's, the small and efficient transistor came on the scene. Finally, computer scientists were able to bring their slow, power-hungry monsters down to size. Still, another advance was to take place before today's computers could be built. This was to come from the world of photography.

Miniatrization and the Chip

As you may know, by using the right equipment, photographs can be enlarged or reduced to suit one's needs. In recent years, a technique has been developed that allows computer engineers to reduce photographically large blueprints of computer circuits to a tiny size. These blueprints may be as complex as the street plan of a major city, but when reduced in size they will fit on a chip smaller than a contact lens. The photos are not made on ordinary photographic paper but on wafers of pure silicon, one of the most abundant elements on earth, found in ordinary sand.

Certain properties of silicon make it the preferred choice in chip making. For instance, by adding various types of chemical impurities to it, silicon can be made to behave like resistors, capacitors, and even transistors. So by doping specific areas of a single silicon chip with these impurities, it is possible to reproduce an entire electronic circuit on it.

From melted and purified sand, crystals of silicon are grown until they resemble long tubes of salami. Then they are sliced into thin wafers and specially coated. Tiny images of the large electronic circuits are etched on the wafers in successive layers. Chemical impurities are added at appropriate spots. And what ends up on the chips are not just pictures but actual functioning electronic circuits, called integrated circuits, or ICs for short.

Integrated circuits made in the 1960's contained about a hundred electronic components. This enabled engineers to build suitcase-size "small" computers for laboratories and other institutions. By the late 1970's, LSI (large-scale-integration) chips with over a hundred thousand components were made. These chips are so complex that just one of them could theoretically perform the functions of a complete computer, such as operating a microwave oven or running a car. Today, computer scientists are talking about VLSI (very large-scale-integration) chips that contain millions of components. Imagine crowding the street plans of a city nearly 1,000 miles square, or twice the size of Alaska, onto a chip a quarter inch square!

The Chip and You

Use of the chip eliminates much of the tedious soldering and hand labor that would be required in the manufacturing of complex electronic devices. This makes the end product less expensive, more reliable, and smaller. Mass production has so drastically reduced

the cost of chips with special talents, such as sound synthesis, that they are used in all sorts of products today.

Thus we find these chips used in talking games, vending machines, and automobiles all around us. In some countries the telephone "operator" who tells you the time or gives you a phone number may be made of silicon! Consumer products that use chips to understand your spoken commands are also becoming popular. Some of these may just be gimmicks, but others could provide much-needed assistance to handicapped persons.

Chips have also been harnessed in the industrial and business realm. In factories, they are used to control robots that can replace humans in boring, repetitive, or dangerous jobs. They are already making major inroads in automobile manufacturing, doing jobs like welding and painting. In offices, typewriters are rapidly being replaced with electronic

word processors that check your spelling, allow you to make changes without retyping the entire document, and even print mailing labels automatically. This, however, is sometimes a mixed blessing. White-collar workers may have been freed from the drudgery of their office routine, but they are increasingly glued to the computer screen instead.

On the other hand, silicon chips have notably contributed to the revolution in communications technology that this generation has seen. The magazine you are reading was written on computer screens, typeset by computer, and printed with computer assistance. Indeed, through its unique MEPS system (Multilanguage Electronic Phototypesetting System) for computer-assisted typesetting and printing, the Watchtower Society is pioneering this multilanguage application of the increasingly common, valuable, and useful electronic building block—the silicon chip.

"THE KEY TO DISASTER"

I HAVE handled guns since I was a boy, but I will never own one again. We have a small farm, and I felt I needed a gun for rodent control. One day my wife and I were working in the field, getting ready for some planting. It was particularly hot that day, so we left our two sons in the house where it was cooler. We were only a few hundred feet away and felt that they would be all right playing together. I was on the tractor when the older boy came running to me and cried: "Daddy, I think baby's been shot!" I ran to the house and found my wife on the back steps giving CPR (cardiopulmonary resuscitation) to the child. As I dialed 911, I begged Jehovah to help my son live, but if

not to please remember him in the resurrection. He died there in his mother's arms.

He was two and a half years old. He was so tender and innocent. The official report lists the shooting as accidental. The older boy took the rifle from our bedroom, loaded it, and was playing with it. The loss of our son, particularly in this manner, is a blow we will feel until the day Jehovah restores him to us.

Leaving the boys alone was a mistake, but having a gun in the house was the key to disaster. A gun is nothing more than a tool of destruction. I will never be able to justify having had one.—Letter received last December from a Witness in Arizona.

Spectacular SKY-SHOWS



Tucson, Arizona; photo by Manley Studios

8,000,000 PERFORMANCES DAILY

CHILDREN fly kites in complete safety. Benjamin Franklin flew one and could have killed himself. The children are having fun. Franklin was living dangerously. In 1752 he sent a silk kite into a thunderstorm and drew sparks from a key. The harmless sparks could have been a deadly thunderbolt. Instead, Franklin's kite-flying led to a happy ending—his development of the lightning rod. But long afterward, lightning itself remained a mystery.

Steps toward understanding began a century ago, but complete understanding is still elusive. Lightning may occur within a cloud, from cloud to cloud, or from earth to cloud. But how are positive and negative electrical charges built up to initiate the discharge? Theory holds that it happens when raindrops and pellets of ice collide with a



mist of water droplets and ice crystals in those spectacular thunderheads—clouds several miles high, in turmoil with updrafts and downdrafts, billowing upward like heads of gigantic cauliflower.

Concerning these tumultuous activities, an article on "The Electrification of Thunderstorms" in *Scientific American* comments: "The basic microphysics behind them remains to this day a neglected and unsolved problem. The lack of a microphysical description of static electrification is the most serious gap in the understanding of thundercloud electricity." The article does, however, offer a very interesting analogy: "The underlying physical mechanism may well be related to whatever causes the shoes to charge when one walks on a rug or a glass rod to charge when it is rubbed with a piece of wool."

While lightning's origin in thunderheads is still debated, it happens often enough. *Reader's Digest* in its article commented: "Right now, as you read this, approximately 1800 electrical storms are in progress around the world. They are giving forth about 600 lightning flashes a second, of which 100 strike the earth. That's roughly 8.5 million lightning bolts touching down every 24 hours." *Scientific American*'s figure is in close agreement—8 million.

The actual lightning flash comes as a climax of the following events. A thundercloud generates negative charges along its bottom, which induces a positive charge on the earth's surface beneath it. This positive charge follows along under the cloud, running up trees, hills, tall buildings, even people, reaching for the negative bottom of the cloud. When the

Lightning displays during
"monsoon" season in Arizona

Below: Two yuccas are highlighted by lightning
On opposite page: A fire started
by lightning





cloud accumulates a 100-million-volt potential—it can be as much as 300 million volts—its energy spills out in what is called a stepped leader. Its course is irregular and forms many branches on its downward path.

The Show Begins

Carrying a few hundred amperes in a latticework of streamers too faint for humans to see, the leader comes close to the surface of the earth—with in a hundred yards or less. Now the positive charge on earth is finally able to jump the gap, meets the stepped leader, and with a tremendous burst of light, it flashes up the pathway the leader has left and reaches the cloud. As it goes, it fills outside channels and wrong turns to form the blazing many-channeled pattern that we are familiar with—a lightning bolt that seems to come from cloud to earth, but actually goes from earth to cloud. Immediately after this initial flash, however, lightning and leader then travel repeatedly back and forth between cloud and ground. A typical lightning flash has three or four of such strokes, but *Scientific American* reported on one that had 26!

Lightning produces thunder, one of the loudest sounds in nature. But how can one bolt of lightning producing one blast of thunder, essentially instantaneous, generate the protracted sequence of sound that crashes and rolls, rips and rumbles, for several seconds afterward? That lightning causes a thunderous blast is no mystery. Air has electrical resistance, so it is heated by the passage of an electric current just as a wire is. Lightning heats the surrounding air up to 50,000 degrees Fahrenheit, causing it to expand rapidly as a massive shock wave with

John Kamenchuk

pressure from 10 to 100 atmospheres, which in turn soon becomes a sonic boom—thunder. Since sound travels so much slower than light, it is no mystery that the thunder is usually heard seconds after the lightning is seen.

"Little Thunders" Make Big Thunder

But why do the sounds of thunder vary so much in nature? Lightning travels in a ragged course, but many segments of varying length are relatively straight. Each one of these segments points in a different direction, is of a different length, produces its own individual sound, and radiates its sound out in waves roughly parallel to its own orientation. Hence, many individual "little thunders" of varying volumes and directions combine to make the total cracks, rumbles, and reverberations you hear in the one great, long peal of thunder. All the little thunders are sounded almost simultaneously, but the ones nearest the listener are heard first and crack the loudest, while others farther up the thunderbolt add their contributions later—how much later depends on how far away they are. Hence, "what is heard in a peal of thunder," the *Scientific American* article entitled "Thunder" explains, "depends in large measure on the characteristics of the particular lightning flash that produced it."

There are many different kinds of lightning flashes, producing different thunderings, some heard by humans, some not. For example, there are lightnings called streak, ribbon, forked, heat, sheet, intracloud, bolt from the blue, and superbolt. Run-of-the-mill lightning bolts discharge about one billion watts, but superbolts, recently discovered rare flashes of lightning, give from a hundred billion to possibly ten trillion!

Lightning does harm. "In the U.S. alone lightning annually causes about 150 deaths and \$20-million worth of property damage and sets 10,000 forest fires, which destroy \$30-million worth of marketable timber," says *Scientific American*.

Superior Fertilizers, Global Batteries

But it also does good. Around the world, eight million lightning bolts daily rip apart the

atmosphere, ionizing the air, creating nitrogen oxides, which are dissolved in rain and carried to earth as dilute nitric acid. There it dissolves into solution the minerals needed by plants. Also it makes nitrogen available for plants. Farmers add nitrogen fertilizers, tens of millions of tons of it annually—so much that it becomes deadly to soil organisms and in runoff kills animals and fish in lakes, streams, and rivers. But lightning's gentle "thunderstorm rainwater" adds fixed nitrogen in the right amount, and in comparative tests it has resulted in crop yields 50 percent higher than those obtained with commercial fertilizers. "Lightning," *New Scientist* says, "may account for as much as half the world's supply of fixed nitrogen, according to two American chemists. This is nearly five times more than previously thought."

Also, thunderstorms form the "batteries" for maintaining the global circuit. Concerning this, *Scientific American* says: "Between the negatively charged surface of the earth and the positively charged atmosphere is a steady potential difference of about 300,000 volts. . . . It is now generally believed this 300-kilo-volt 'ionospheric potential' is the result of charging by thunderstorms, which form the 'batteries' of the global circuit. Electric currents of about one ampere per storm flow upward from the positive tops of thunderclouds and return to the earth in the fair-weather regions of the atmosphere. . . . [Then] a one-ampere current has to flow from the earth's surface to the cloud bottom. Rain currents, corona discharge and lightning all contribute to this charge transfer."

What is the ultimate source of the grandeur of the thunderstorm? Jehovah God is the Creator of the spectacular sky-shows that flash and thunder in awesome flashings and booming thunders. The Bible speaks of these as accompaniments to his dealings with mankind, as embellishments of his heavenly throne, and as harbingers of his approaching judgments. "His lightning is to the extremities of the earth. After it a sound roars; he thunders with the sound of his superiority."—Job 37:3, 4, 11-13; 40:9; Exodus 19:16; 20:18; Psalm 18:13, 14; 29:3-9; Revelation 11:19.

**RELIGION'S FUTURE
IN VIEW OF ITS PAST**

Part 10: 537 B.C.E. onward

Still Awaiting a Messiah

"Self-determination is but a slogan if the future holds no hope."

John F. Kennedy, 35th president of the United States

SEVENTY years of Babylonian captivity were over! Babylonian conqueror Cyrus, king of Persia, was letting the Jews return home. But once back in the Promised Land (537 B.C.E.), their hope of enjoying self-determination as a free nation went unrealized. They had no king, and the political authority of their governors was soon eclipsed by the religious authority of the high priest, who came to be viewed as head of the nation.

Pursuing a Messianic Hope

According to *The Concise Jewish Encyclopedia*, it was during this period that the concept of a Messiah developed, "the ideal monarch of future days [who] would not be just another 'anointed' ruler but the ruler who would destroy Israel's enemies and establish a perfect era of peace and perfection."

In the fourth century B.C.E., by con-

quest, Alexander the Great gathered the Jews into his embrace. But he was obviously not the Messiah they were awaiting, even though his empire did have a tremendous impact on their land, their culture, and their religion.

After Alexander's death, Palestine remained in Greek hands, first under the Egyptian Ptolemies and later under the Syrian Seleucids, both dynasties set up by Alexander's successors. As Greek influence grew, prominent and aristocratic Jews began viewing Jewish traditions and customs as out-of-date. Taking the lead was the Tobiad family, who boosted Menelaus, apparently a relative of theirs, into the high priesthood during the reign of Seleucid king Antiochus IV Epiphanes (175-164 B.C.E.). This they did, even though Menelaus was not of the traditional priestly house of Zadok, high priest in Solomon's temple. Greek influence became so strong that Jewish religious celebrations were outlawed

and the temple was turned into a Greek shrine!

In 167 B.C.E., Jewish priest Mattathias and his five sons, commonly called the Macca-bees, or Hasmonaeans, rebelled. The Macca-bean Revolt, originally religious in nature, soon became a political struggle for Jewish self-determination. In 165 B.C.E., the temple was recaptured and rededicated, an event Jews today around the world annually celebrate during the eight-day feast of lights known as Hanukkah. But a Messiah was still not in sight.

Negligent Shepherds and Religious Disunity

At this time, "not only was spiritual and social leadership of the people in the hands of the priests," comments the Jewish *Pictorial Biblical Encyclopedia*, "but they formed the strongest and wealthiest class in Jerusalem, politically and economically." The priests became so aristocratic and negligent in fulfilling their shepherding duties, however, that non-priests began replacing them in interpreting the Law and administering justice. These men, known as scribes, were adroit at finding loopholes for people intent on circumventing the Law.

During this same period of time, Jewish religion broke up into warring factions. The Pharisees taught that God had given Israel a two-fold law, part written and part oral. It was on the basis of this oral law that they recognized the legitimacy of the high priestly line even after the traditional line was broken. The Saducees, on the other hand, denying the existence of an oral law, claimed that only a direct descendant of Zadok could serve as high priest.

The name "Pharisee" came from a word meaning "separated" or "distinguished." Some say it was used by their opposers to brand them as heretics. Others claim it refers

to the "distinguished" position they assumed, separating themselves from the 'am ha-'a'rets (people of the land), whom they considered unclean. The Pharisees were extremely self-righteous in their observance of both the written law and the oral law. The Sadducees' equally rigid attitude toward the written law possibly "arose not from any special religious feeling," writes Jewish author Gaalyahu Cornfeld, "but as a political weapon in their opposition to the legislative powers of the Pharisees."

The Essenes, another religious group, apparently developed during the same time. They broke with the official priesthood, refrained from taking part in religious services and sacrifices at the temple, but otherwise closely adhered to the Law. Like the Pharisees, to whom they were in many ways similar, they fell victim to Hellenistic influence, adopting belief in an immortal soul.

The group probably had no more than about 4,000 members, all male adults, many of whom were celibate. They lived in communal houses in isolated communities throughout Palestine. The *Encyclopædia Judaica* speaks of their supposed pacifism, saying that it "was probably like that of the modern Jehovah's Witnesses." But it is evident that the Essenes did not really practice the strict neutrality today observed by Jehovah's Witnesses. The Jewish *Pictorial Biblical Encyclopedia* says that the Essenes "fought heroically in the rebellion against Rome, some leaders even coming from their ranks." Jewish historian Josephus refers to one such leader—a certain "John the Essene" who served as a Jewish general in the revolt of 66 C.E.

The Dead Sea Scrolls, found in 1947, provide information about the Qumran religious sect, thought by some scholars to be identical with the Essenes. But as to the sugges-



The Western Wall, commonly called the Wailing Wall, is all that the Jews have left of their holy temple, destroyed in 70 C.E.

tion that John the Baptizer and Jesus belonged to this group, or were at least influenced by it, *The New Encyclopædia Britannica* says: "Important arguments . . . speak against this assumption." There are "fundamental differences between the Qumrān sect and John the Baptist . . . [as well as] diametrical differences between the views of the sect and the range of Jesus' ministry, his message of salvation, his understanding of God's will . . . and, especially, the radical character of his commandment of love and his fellowship with sinners and social outcasts."

In reality, every Jewish religious faction opposed John the Baptizer and the one he announced as being the Messiah. Instead of giving credence to John's message, many of the priests, Josephus says, turned to the Zealots, a group of Jewish revolutionaries bent on self-determination. For decades groups like this, opposed to the Roman domination that had replaced Greece in 63 B.C.E., carried on terrorist activity. Finally in 66 C.E., they broke into open rebellion. This led to the destruction of the Jewish temple and their priesthood. The Messianic hope dimmed.

A Judaism With No Temple, No Priesthood

Centuries before this, during or perhaps shortly after the Babylonian exile, great emphasis had been placed on gaining knowledge of the Law. Centers of instruction, known as synagogues, were built, and thereafter the temple was only visited on special occasions and for the purpose of offering sacrifices. So by the first century C.E., it was quite normal to worship in synagogues. Then, after the destruction of the temple in 70 C.E., they were apparently viewed as having replaced it.

Emphasis now shifted from the nonexistent priesthood to teachers known as rabbis. The Sadducees had ceased to exist as an effective body, and the Essenes had simply disappeared, so the Pharisees emerged as the undisputed leaders. Ellis Rivkin of Hebrew Union College explains the influence they had. "The Pharisees' oral law gave birth to the Mishnah, the Palestinian and Babylonian Talmuds, the geonic, medieval, and modern *responsa*, and the various codes of Jewish law." *The New Encyclopædia Britannica* adds: "Even today the various Jewish groups, whether Orthodox, Conservative, or Reform, all claim

direct spiritual descent from the Pharisees and the rabbinic sages."

Messianic Hopes in the Diaspora

Even before 70 C.E., millions of Jews lived outside Palestine, chiefly in Syria, Asia Minor, Babylonia, and Egypt. After 70 C.E., however, any surviving Jews were completely uprooted, scattered to take up life in the *diaspora*, the Greek word for "scattering." Even there, many retained their hope of self-determination under a coming Messiah. Jewish leader Bar Kokhba proved to be a counterfeit messiah, unsuccessfully leading a rebellion against Rome in 132 C.E. According to *The Jewish Encyclopedia*, 28 such false messiahs appeared between then and 1744 C.E.

Thus, perhaps understandably, the Messianic hope became muddled. The *Encyclopædia Judaica* explains: "Jewish ideology in the Middle Ages did not receive from the ancient period a coherent, unified concept of the Messiah, . . . and talmudic literature and the various Midrashim included many contrasting views." As early as the 12th century, Jewish philosopher Moses Maimonides argued that Messiah's reign was perhaps simply pictorial of a higher form of society. In the 19th century, Reform Jews "substituted the belief in a messianic age for the belief in a personal Messiah. . . . The messianic hope was severed from its traditional associations with a return of the exiles to Zion."

Shortly before this, the Haskalah (Enlightenment) movement in Europe further confused the issue. It promoted a Judaism that was willing to conform to the Western way of life. It helped divide Jews into those viewing self-determination in a reestablished Jewish homeland under the Messiah to be of top priority, and those feeling that integration into the life of the country of birth was of greater importance.

These developments, plus the rise of anti-Semitism, paved the way for the birth of modern Zionism, fathered by Theodor Herzl at the end of the 19th century. Today, in May 1989, 41 years to the month after the founding of the State of Israel, Jews are enjoying the self-determination as a Jewish community in a Jewish homeland that he envisioned. Has their Messianic hope been realized?

If so, why do some Jews, according to *The Times* of London, see "in Zionism a profanity which became a reality with the creation of Israel"? Why did the late historian Theodore H. White, himself a Jew, candidly admit: "There are almost as many different sects of Jews, who quarrel with each other, . . . as there are among Protestants"? Why did *Time* magazine, calling attention in 1987 to the squabbling religious factions within Israel's 120-member political body, the Knesset, write: "Some durable solution must be found if Israel . . . is not to become a house fatally divided against itself"?

Modern Jewish self-determination offers little hope for the future. By trusting in human politics to realize their Messianic hope, Judaism has ignored the words of its own sacred writings: "It is better to take refuge in the LORD than to trust in man. . . . Put not your trust in princes, nor in the son of man, in whom there is no help."—Psalm 118:8; 146:3, *The Holy Scriptures*, published by the Jewish Publication Society of America.

In contrast with the difficulty many Jews today have in identifying their Messianic hope, a number of their ancestors back in the first century C.E. had no difficulty whatsoever. (See John 1:41.) They became followers of the One they accepted as the Messiah, becoming zealous proponents of a religion we can aptly call "The Way of Faith, Hope, and Love." Our next issue will explain.



How Can I Improve at Making Conversation?

YOUNG Sharon is sensitive and shy by nature. She confessed in an interview with *Awake!*: "When I'm introduced to someone, I don't know what to say. I don't want to say the wrong thing and perhaps upset the person." For shy youths, like Sharon, it takes real effort to make conversation.

For others, ethnic differences may be a communication barrier. Consider the case of Lucas, a black South African youth, who became part of the interracial staff that publishes this magazine in the local languages of that land. "It is quite a cultural shock," he explained, "for a black to come and sit at a table and eat a meal with whites. Coming here and living with white people made me nervous because we had different backgrounds. I wondered if what I said would be accepted. It takes time to overcome that feeling."

Even within the same ethnic group there are at times obstacles in communicating. As a South African, named Pieter, recalls: "I grew up on a farm and then our family moved to town. I could talk about farm life but town life was very different. I found myself listening in awe to the conversation of my friends, and I just kept quiet."

If you have a problem similar to one of the above, what can you do about it?

Overcoming Shyness

Do you feel overwhelmed in the company of others? Take heart, this is a common symptom of growing up. The teenage years are a time of self-awareness—when youths become acutely conscious of what others think of them. Often they avoid being the center of attention and say as little as possible.

"Shyness," explains Dr. Tony Lake in his book *Loneliness*, "is a kind of protection. The shy person is saved from making mistakes because shyness stops such a person taking the risk of looking or sounding foolish." Just the thought of joining in a conversation can make shy people perspire! They just cannot build up enough courage to speak. Or, if they do, the words come out in a jumble. Hearers may look puzzled or even laugh. If this happens to you, what should you do?

"The answer," explains Dr. Lake, "is to give ourselves time, and not to make the mistake of thinking that there is something fundamentally wrong with us. We should concentrate on listening until we feel ready to talk at any length." (Compare James 1:19.) This positive approach has helped many, like shy Irene. "I listen carefully to other people's conversations," she explains, "to learn from them. Then I do research and study to get more information. If the subject comes up again, I am able to talk about it."

What If You Are Misunderstood?

Sometimes your sincere attempt to make conversation might bring a negative reaction; what you say is taken in the wrong way. Again, don't take such incidents so seriously that they cause you to crawl back into your shell. "Do not hurry yourself in your spirit to become offended, for the taking of offense is what rests in the bosom of the stupid ones," says Ecclesiastes 7:9.

The Bible tells about young David who long ago was badly misunderstood. His father sent him with a gift to his older brothers who were serving in the Israelite army. On arriving, David was shocked to hear the taunts of the Philistine giant, Goliath. "Who is this uncircumcised Philistine that he has to taunt the battle lines of the living God?" he asked the soldiers. One of David's brothers, Eliab, overheard this and became angry. Misjudging his young brother's motive for coming, he said: "I myself well know your presumptuousness and the badness of your heart, because you have come down for the purpose of seeing the battle."—1 Samuel 17:26-28.

Maybe you have similarly been misunderstood by others. If so, do not let it crush you. As David's good motive was soon revealed so, too, your sincere efforts at making good con-

versation will eventually be rewarded. "Fine works," the Bible assures us, become "publicly manifest." (1 Timothy 5:24, 25) So, just keep on trying.

The Need for Empathy

How, though, can you begin? "The most productive form of communication," states Larry L. Barker in his book *Communication*, "is interaction with empathy. Empathy means deep understanding of other people, identifying with their thoughts, feeling their pain, sharing their joy." An outstanding example in showing this quality is Jesus Christ. Once he started a conversation with two of his disciples who were mourning over his death. Concealing his true identity, the resurrected Jesus asked: "What are these matters that you are debating between yourselves as you walk along?"—Luke 24:17.

The two expressed surprise that this "stranger" had not heard of the tragic developments that had just taken place in Jerusalem. "What things?" Jesus again asked. A lively conversation followed and afterward one of the disciples remarked: "Were not our hearts burning as he was speaking to us on the road, as he was fully opening up the Scriptures to us?" (Luke 24:13-32) Yes, Jesus enjoyed many fine conversations because he listened to others and showed empathy.—John 4:7-26.

Getting Conversations Started

Notice that the above conversation was started by a simple question. Questions are excellent conversation starters. Of course, it is easy to think of a question on a topic that is of intense interest to you, but this may not always lead to a lively conversation. Remember, the Bible exhorts us to "be interested in others, too, and in what they are doing." (Philippians 2:4, *The Living Bible*) So, what is needed is for you to think of a question that your associate will enjoy answering. That

IN OUR NEXT ISSUE

Merchants of Death

—How Do They Affect You?

Are You Always Late?

*Can You Really Care
for a Pet?*

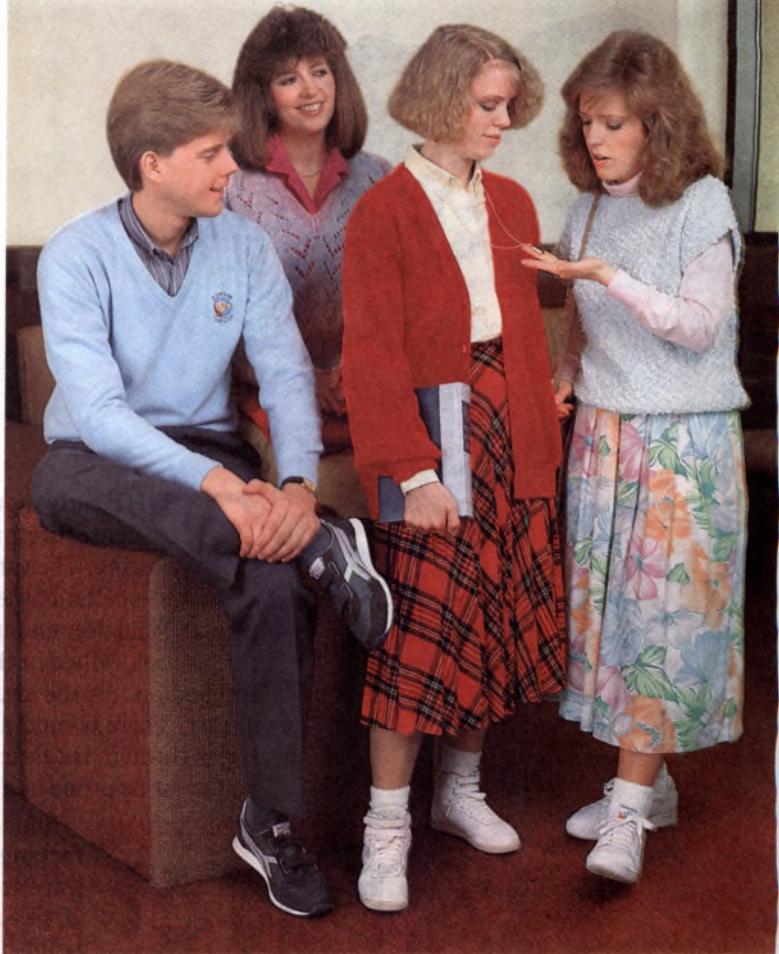
Make a deliberate effort to get involved in conversation

takes empathy. You may have to choose a subject that is of no interest to you, but you may well be rewarded with an enthusiastic response as well as some valuable information.

Author Les Donaldson lists "ten easy ways to start a conversation." Seven of his suggestions involve questions, asking about a person's background, asking for advice, for help, for an opinion, for an evaluation, asking about local customs or local restaurants. Whatever the question, it should be asked with sincerity. You should also pay attention to how you listen. (Compare Luke 8:18.) If you allow your mind and eyes to wander, probably the one answering will doubt that you are really interested in what he has to say.

Donaldson's other three suggestions for starting conversations are: commenting on a local event; remarking on something you find praiseworthy, such as the scenery; or paying a compliment. "If you look for things to compliment people on, you will find them in abundance," the author says in his book *Conversational Magic*. But he adds this warning: "People see through insincere compliments and will not be likely to converse very long with an insincere person."

Regardless of what conversational "hook" you choose, persistent effort usually brings results. Consider Sharon, mentioned at the outset. She is now 22 years old and has made remarkable progress in overcoming her shyness. Since being interviewed two years ago, she has



become a full-time minister of Jehovah's Witnesses, spending over one thousand hours a year visiting strangers and starting Bible conversations. As for Lucas and Pieter, they have now worked many years together in the production of Bible literature at the Watch Tower Society's branch in South Africa, and you would find it hard to believe that they at one time had a problem trying to make conversation.

So if for some reason you find it difficult to make conversation, don't give up; give yourself time. Listen to others. Study and read to keep up-to-date with current topics. Developing the art of conversation will enrich your life and add to the happiness of others.



The early morning air is chilling. The trees in the
dense forest are still—hardly a breath of air is stir-
ring. The variety of birds that once roosted and took
shelter in the leafy branches have suddenly dis-
appeared. Wild deer and other animals who only a few hours
earlier took refuge in the dense foliage have fled. A sense of
foreboding fills the air. Inch by inch on your stomach you
slither. There is mud and slime underneath. The dampness
soaks through the tattered camouflage suit. Survival dictates
you must lie prone in it.

It's just another day of paintball. You're not alone. You're part of a team. You're not just playing a game. You're fighting for your life. You're not just having fun. You're experiencing the thrill of battle. You're not just wearing a costume. You're wearing a uniform. You're not just playing with a gun. You're playing with a real gun. You're not just playing paintball. You're playing war.

BANG! BANG! YOU'RE DEAD!

Suddenly the stillness is shattered by a nerve-racking, warlike cry. Another human creature leaps from the underbrush not more than 20 feet away. With reckless abandon he fires point-blank. His weapon jams without getting off a shot. His cursing fills the air. Instinctively you roll to the side, simultaneously squeezing the trigger of your weapon. In a blink of the eye, crimson covers the enemy's chest and oozes over the front of his uniform. You have met the enemy and he is yours!

Are these the saddened reflections of a veteran of World War I or II, or Korea, or Vietnam? No, they are the setting and scenario of the thousands of "weekend warriors," both men and women, who weekly take part in one of the fastest-growing sports in the United States and Canada, also in England, France, West Germany, and Japan. Divided into two

teams of 12, 15, or 20 combatants each, the objective of the game is to capture the opposing team's flag.

It is played by men and women of all walks of life—doctors, lawyers, nurses, secretaries, high-tech engineers, retail busi-

nessmen, and those up and down the corporate ladder. Dressed in camouflage fatigues, with faces smeared with mud or brown, black, and green coloring, all players are reduced to one common denominator—grotesque-looking adults playing at the game of war.

Equipped with specially designed handguns and rifles that can shoot gum-ball-size gelatin capsules filled with red, water-soluble paint, speeding at 250 feet per second, bursting on impact, each player takes on the ominous appearance of a seasoned veteran of Vietnam combat. The telltale sign of red oozing seemingly from every pore is a notice to both friend and foe of a fatal casualty. Once any player is shot by an opponent, he is "dead" for the rest of the game. No prisoners taken!

The battleground can be any wooded area, often rented, leased, or owned by the franchise. Many such tracts have streams and dense underbrush, with the slime and mire mentioned at the outset. More elaborate ones may have specially constructed huts that resemble Vietnam villages for house-to-house combat. Many are given Vietnam names. Some may have army tanks to add to the realism or caves and foxholes for hiding or ambush. Small platforms may be constructed in the branches of trees, from which snipers may track their victims and make their "kill." If the opposing team's flag is not captured, then the team with the greatest number of "kills" wins the game.

War Games—Are They for Christians?

About 20 members of two Sacramento-area churches, in California, paid about \$35 each to "participate in the increasingly popular outdoor sport," one reporter wrote. "Church against church, they took to the rugged terrain for nearly six hours—hiding behind trees and 55-gallon drums, firing carbon-dioxide-powered guns and trying to capture the other team's flag." When questioned about the propriety of a church leader engaging in such a sport, a preacher of one of the churches said: "Just because you're a Christian doesn't mean you can't be a human being and have fun." His counterpart, pastor of the opposing team's church, reportedly "had no doubts about playing war games on a regular basis." However, should not one calling himself a Christian have doubts about playing games that glorify war?

One player stated: "It's everybody's dream to sneak up and get right behind your man and blow him away. That's the ultimate kill. He never knows what hit him and he's dead." Another said: "I fell in love with it the first time I played. It's

like getting addicted. You have to come every week and get your adrenaline rush."

Many behavioral experts denounce war games as being offensive and a stumbling block to others, calling them a "frightening phenomenon." Various reactions were:

"The act of pointing a gun at someone, paint pellets or not, and pulling the trigger could lead to desensitization when it comes to real violence." "Getting a rush from shooting people seems unsavory in the extreme." "I see it doing far more harm than good," said a professor of psychology at the University of Wisconsin (U.S.A.) and a specialist on aggression. "The evidence is clear that there's no beneficial catharsis and that there can be a reduction in the inhibitions against violence." "Other critics have called the war games craze a sick version of people hunting and simulating murder," says the magazine *New Orleans*. "One . . . suggested that war games participants were actually in need of a good therapist."

Besides the morally obscene nature of the games, they are fraught with danger, resulting in many injuries.

War is an abhorrent thing. That is why a Christian gets no thrill or exhilaration from simulating or perpetuating it, dramatizing it. Rather than taking delight in participating in such aggressive acts, the true Christian delights in the fact that the Grand Creator, Jehovah God, will soon make "wars to cease to the extremity of the earth."—Psalm 46:9; Isaiah 2:4.

WATCHING THE WORLD

RELIGIOUS FREEDOM IN MOZAMBIQUE

Africa News reports that Jehovah's Witnesses in Mozambique were granted a measure of religious freedom in 1988. In 1975 the government exiled thousands of them to a remote northern district of the country because they refused to repeat political slogans, an act that violates their Bible-trained conscience. They lived in isolation there until 1986, when rebels against the Mozambican government began to attack them, kidnapping and enslaving women and murdering dozens by death squad. They fled to neighboring Malawi, which in turn insisted that the United Nations get them out of the country. Then the Mozambican government lifted the restrictions that had exiled the Witnesses, allowing them to return to the homes they left 14 years before. They still hold faithfully to their Christian neutrality. commendably, the government is currently allowing them to live and worship in peace.

BLOOD BANK SUED

For the first time, a U.S. blood bank has successfully been sued for providing blood that infected a transfusion recipient with the deadly AIDS virus. The victim, a five-year-old boy, was given the transfusion during open-heart surgery just a month after he was born. The lawyer for the child's family argued in court not only that the blood bank had been negligent in its testing and screening of the blood but also that it had been fraudulent in

that, motivated by a desire for profit, the blood bank had not allowed the family to donate the blood themselves. According to *The New York Times*, the jury decided that the blood bank had been negligent and awarded \$750,000 in damages to the boy and his parents.

THE SECURITY BUSH

Security-conscious organizations in the United States, such as the CIA, the military, and NASA, have turned to an old idea in protecting their grounds: the bush. Commonly used a hundred



years ago to pen in livestock, this particular shrub may look innocuous from a distance, but its leaves conceal hidden weapons—four-inch thorns, sharp as razors. Further, *Discover* magazine reports that "when mature, the hostile hedge is so thick it can stop a jeep." It costs a fraction of what a wire fence does, yet it lasts three times longer. The proper name for this threatening thicket is trifoliate orange. Its nickname is P.T., short for Pain and Terror.

"HIGHLY IMPROBABLE"

Scientists are still perplexed over the origin of life. The

French daily *Le Figaro* made the following comment after reporting on a convention of biologists held in Paris: "Where does life come from? . . . Intervention from outer space in the form of extraterrestrials or asteroids? Divine intervention? No one has a scientific explanation." The article went on to state: "There is already such a great difference between the most complex mineral systems and the most simple cells that no one is able to understand how the transition was made. The appearance of life on earth is the accumulation of such a series of improbabilities that it has become in itself highly improbable." Yet life does exist. Evolution cannot explain how it got here, but the Bible does.

GREED DESTROYS TREES

India's Uttar Pradesh state has lost nearly half of its precious forests since 1952—but not just to lumbering. *India Today* magazine reports that illegal tapping of pine trees for resin is doing most of the damage. The Forest Department has issued rules on how to tap the trees without damaging them but so far has been unable to enforce the rules. Meanwhile, people greedily tap the trees in such a way that not only are they rendered useless as resin producers for years to come but they also fall more readily in storms. Some even burn down the trees that they have tapped dry so as to hide the evidence of their illegal activity. This in turn causes forest fires. "It's a classic case of venality," remarks *India*

Today, "slaying the goose that lays the golden eggs."

WARS OF 1988

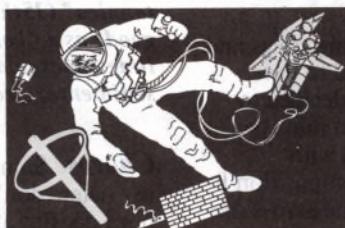
War continues to reap its grim harvest of corpses. The year 1988 saw 22 wars fought around the world, killing as many as 416,000 people by one estimate. According to the director of the Lentz Peace Research Lab in St. Louis, Missouri, U.S.A., the leading cause of conflicts was ethnic strife, with some seven wars to its credit. Other causes were rebellions from the political right or left, power struggles between rival religious factions, clashes over territory, and a struggle for "independence." Most of the dead, though, were not soldiers. They were civilians.

ANCIENT FARMING SECRETS

Archaeologists have learned that an ancient Peruvian farming technique, lost for centuries, may be more effective than modern methods. The common practice in the plains around Lake Titicaca until a few centuries ago was simple: Fields were made of raised platforms of soil from 13 to 33 feet wide, about 3 feet high, and from 33 to 330 feet long, with canals of equal width and depth alternating between them. In dry seasons, the algae from the canal beds were shoveled onto the platforms to nourish the crops. Since water retains heat, the canals also served to keep the crops warm in times of frost. The raised fields seem to survive both flood and drought better than conventional fields. In modern experiments, the ancient method produced up to ten times as much as conventional farming—and that without the expense of machinery and fertilizer.

GARBAGE IN SPACE

Mankind's pollution woes continue to spread—even into outer space. Years of sending machinery into orbit without considering the debris left behind is beginning to exact a price. Scientists planning to launch new spacecraft must now devise ways of protecting them from space debris that hurtles along at speeds up to nearly seven miles per second. At such speeds, a marble-sized piece of debris "can pack the explosive power of a



hand grenade," says *The New York Times*. One engineer has even designed an orbiting robotic space janitor to dismantle and stow away space debris. Coping with space junk is not easy, though. Hundreds of thousands of pieces are too small to be detected from earth; yet they are large enough to be deadly. As one scientist said to the *Times*: "There's frustration and disgust that what ought to be a clean environment is a mess and seems to be getting worse."

CHILD PROSTITUTION IN THE PHILIPPINES

Child prostitution has become rampant in a small town in the Philippines, reports *The New York Times*. In 1988, 22 foreign men were arrested for running prostitution rings. One of them had hundreds of pornographic

pictures of young local boys, with their names and records available. A local organization called the Council of Citizens for the Protection of Children has made efforts to stop the disgusting trade. They have met, however, with stiff opposition—even from the children's parents! Apparently the wealthy foreign customers shower the boys and their families with expensive gifts. The organization estimates that a third of the town's children have taken part in the trade. Notably, the *Times* comments that "the powerful Roman Catholic Church has had little to say on the subject of prostitution . . . in marked contrast to its aggressive stand against artificial birth control."

SPIRITUALLY DEAD?

The little Italian lakeside town of Manerba had an unusual death notice posted on its billboards recently. The somber black-bordered poster read, in part: "The Parish sadly announces the spiritual death of the town of Manerba after a long and gradual illness caused by tourism, boredom, and absenteeism. The funeral will not be held because the deceased are still on their feet. One wishes to thank the small number of those who go to Sunday Mass and whoever may think of doing so in the future." In its report on this, the newspaper *Il Giornale di Brescia* noted: "At the end of every summer, the number of the faithful drops, and year after year, the erosion of the assembly becomes a worrisome phenomenon." The author of the sign, local curate Mario Filippi, added: "I know that other towns on [Lake] Garda are in the same condition. And perhaps the situation is widespread."

FROM OUR READERS

Haiku Thank you for the article "Saying It in 17 Syllables." (January 8, 1989) I am nine, and we were working on haiku [a form of Japanese poetry] in school. I brought it in the article, and my teacher read it to the class and passed it around. Everyone enjoyed it, and then they looked through the whole *Awake!* My teacher thanked me for bringing it in.

R. K., United States

I have a keen interest in writing songs and poetic verses. I would have liked to have taken up a career in music but decided to dedicate myself to the Christian ministry. Recently my mind was plagued with thoughts about the career in composition I could have had. However, I came across the article on haiku. It made me realize that I could enjoy writing poetry just for pleasure!

D. M., Scotland

Grief I was deeply moved by the articles on 'Facing Loss.' (August 8, 1987) At the end of 1988, my best friend was in a traffic accident and died. I felt a tremendous loss, and these articles have given me very great hope. I saw that I should not bottle up my sad feelings but let the grief out and that those of us grieving should help one another. Wouldn't it be marvelous if the day comes when this kind of deep sorrow is no more?

H. O., Japan

The Bible promises just such a day at Revelation 21:3, 4, where it speaks of a time when "death will be no more, neither will mourning nor outcry nor pain be anymore." This hope does not entirely erase the pain of grief, but it certainly does ease it somewhat and provide great comfort to mourners.

—ED.

Geodes What a wonderful article! (January 22, 1989) I collect minerals, having got the idea from *Awake!* of December 8, 1963. I now have a collection of some 2,000 specimens. However, I got the impression from the article that geodes develop only in sedimentary rock. Can that be correct?

P. K., Federal Republic of Germany

Yes. In fact, "The New Encyclopædia Britannica" (15th edition, 1987) defines a geode as a "hollow mineral body found in limestones and some shales"—both forms of sedimentary rock.—ED.

Chores Sometimes I get jealous because my sisters don't have to work in the house, but I do. But after reading your "Young People Ask . . ." article on chores (January 8, 1989), I felt better. In one of the paragraphs, it says: "Your loving cooperation can also relieve the pressure on your parents." You know what? I think I'm going to vacuum the car now! And that's the truth.

J. W., United States

"Young People Ask . . ." I strayed from the way I was brought up, thinking my mother was too strict when she wouldn't let me go out and enjoy myself like other young people. Having done what I wanted, I ended up committing the sin of [sexual] immorality; I now have to live with my conscience and regrets. Had I listened to my mother in the first place and taken the advice of the "Young People Ask . . ." articles, I wouldn't have these troubles now. I would like to stress to other young people that the advice in the articles is truly for their own benefit and that it pays to take it.

L. J., England

When Is a Pig Not a PIG?



THE answer is, When cholecystokinin says, Enough! If that's too big a mouthful, try CCK. It's a hormone pigs produce when they eat. When their belly is full, CCK signals their brain, 'Back off, dinner's over.' Cows, sheep, and other farm animals will eat till they collapse, but not the much-maligned porkers! Pig farmers view it as an obstacle to fattening their charges, and their pocketbooks.

And they are doing something about it, as reported in *The Wall Street Journal*: "In an Agriculture Department study, scientists discovered that they can block the hormone by injecting pigs with a vaccine that renders their appetites insatiable, in effect producing some real swine. In less than three months, the injected animals consumed an average of 22 more pounds of corn and soybean meal, and put on 11 more pounds of pork, than their untreated pen pals did."

"All creatures," we are told, "make CCK in varying amounts." Humans have it, and work is proceeding to see if it can be augmented to curb out-of-control appetites. Binge eaters, the report says, "show sharply depressed levels of CCK and satiety." But it adds that this "lowered CCK may be an effect of disturbed eating behavior rather than its cause." In humans, it is thought that two regions in the hypothalamus gland, the satiety and the feeding centers, regulate eating. But the proper function of these regulatory centers can be damaged by a prolonged period of overeating. The answer for this is Galatians 5:22, 23: "The fruitage of the spirit is . . . self-control."

