

Awake!

AUGUST 22, 1978

Creation
goes to
college



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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.

The Bible translation used in "Awake!" is the modern-language "New World Translation of the Holy Scriptures," unless otherwise indicated.

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Do others do your thinking?

Propaganda has power.
Does it overpower you?
Or do you have a mind
of your own?

EDUCATION teaches you how to think. Propagandists tell you what to think. True educators present all sides of an issue and encourage discussion. Propagandists hammer hard on their view and discourage discussion. Many times their true motives are hidden. They sift the facts, tell the favorable ones and conceal the others. They distort and twist facts, specialize in lies and half-truths. Your emotions, not your logical thinking abilities, are their target. Many fall easy prey because it takes no effort to feel, whereas thinking is hard labor. And the propagandist sees to it that his message is made to seem wise, the right and moral one, and gives you a sense of importance and belonging if you follow it. You are one of the smart ones, you are not alone, you are comfortable and secure—so they say.

Propagandists have little respect for people's thinking abilities. Hitler wrote: "The intelligence of the masses is small. Their forgetfulness is great. They must be told the same thing a thousand times."

Lenin was more discriminating. He used historical and scientific arguments to persuade the educated minority, but slogans and half-truths to arouse the masses, whom he considered unable to grasp complicated ideas. The pen may be mightier than the sword, but oftentimes it is used to prepare the way before the sword.

Tricks of Propagandists

Symbols stir feelings. Words such as mother, home, justice, freedom—all pack a wallop for the heart. *Slogans* are catchy and seem to be packed with wisdom. *Favorable facts* are exaggerated; the others are distorted or concealed. *Oratory* often substitutes for sound argument, and it diverts attention from unpleasant truths that cannot be concealed. Burn a building in one place while robbing a grocery store somewhere else, is the technique.

Tyranny of authority, ridicule, name-calling, smears, slurs, personal digs—all such tactics are marshaled to assail your mind and take it by storm. Sound evidence,

reasoning, logic? The propagandist's deadliest foes! He therefore attempts to rout reason and stimulate passion. As emotion rises, judgment declines; and, under the lash of stinging words and reckless rhetoric, the mind is herded along. Some propaganda is of this inflammatory kind, but much of it today is more subtle. Many people today are more sophisticated and see through the rambunctious oratory; so a "soft sell" is used instead.

Television commercials specialize in this. Products are associated with happy families, beautiful girls, romantic men, cuddly babies, playful kittens and puppies—all desirable things but which have nothing to do with the products. Television programs are often propaganda, for the new morality, for materialistic goals, for selfish satisfactions. Newscasts are colored. Most situation comedies are superficial fluff.

But even educated, sophisticated persons fall prey to a very unfair and untrue type of propaganda. This type assumes a superior air of dismissal of an opponent's viewpoint, treating it as rather pathetic and really not worth attention. It is what many evolutionists resort to in order to evade questions that they cannot answer. They can't prove their theory. So they resort to making assertions, and they scoff

at all who dare to dispute them. And if any suggest that evolution conflicts with the Bible, these wise ones indulgently smile at the simple souls and indicate that they need this crutch, but that "intelligent persons know that God's Word is only ancient myths." They prove neither their assertions nor their smears, but by the tyranny of authority they pontificate their opinions, squelch objections and intimidate opposers. It works, and supposedly intelligent people who know nothing about the theory believe it because "all intelligent people believe it." But more on this in the next article, "Creation Goes to College."

What About You?

Proverbs 14:15 states: "A simple man believes every word he hears; a clever man understands the need for proof." (*The New English Bible*) Many today are like sponges; they soak up whatever they are submerged in. It is the easy way. Exercise for the muscles is hard work; exercising the mind is even harder. It is so much easier to soak up whatever is around—and today, for the most part, that is television, the printed page, radio and movies. There are, however, some good books, movies and television programs. They require more mental effort to read or to watch. So each individual must choose what he will feed his mind. It is said that we are what we eat, and this can apply to food for both the body and the mind. Whatever you read or watch or listen to, test whether it is propaganda or whether it is the truth. "The god of this system of things has blinded the minds of the unbelievers," that they might not know the vital truths of our time. What about you? Will you let others think for you, or will you do your own thinking? Do your own, and "thinking ability itself will keep guard over you." At the same time, it must be admitted that we need good and proper guidance.—2 Cor. 4:4, 6; Prov. 2:11; Ps. 36:9; Jer. 10:23.

In Future Issues

■ **Do Honesty and Hard Work Really Pay?**

■ **How All Men Came from One Man**

■ **Blood Transfusion: Why Many Are Taking a Fresh Look**

Creation goes to college

How is it received on campus?
Always courteously, sometimes
enthusiastically. But when it
is pitted against evolution,
can it pass the examination?

IF MONOPOLY is inordinately wrong in industry, I ask rather pointedly, isn't monopoly inordinately wrong in education?" That is the question propounded by Professor John Moore of Michigan State University. He further states: "I feel that it is high time now that the taxpayers be assured that their young people hear a fair presentation of both sides of the issue." The issue he refers to is, Did life come about by means of evolution or creation? Moore taught evolution to his science classes for years. Then a friend challenged him to prove it. He couldn't. "I realized I was only teaching what I had been taught," he said. "The reason so many people believe evolution is because so many people are taught evolution only." For the past five years Dr. Moore has included creation along with evolution in his science classes.

Some of his colleagues on the faculty at Michigan State are not happy with this and raise questions about separation of Church and State. However, in considering creation, the main reference that need

be made to the Bible is the first chapter of Genesis. It does not touch on sectarian creeds or forms of worship. It does not propagandize for any particular religion. Moreover, the Bible is quoted in literature classes, is referred to when certain religions play a role in history, and comparative-religion classes consider religious teachings and Biblical quotations. None of this is considered a violation of separation of Church and State. Hence, teaching creation should not be so considered.

Discussions of creation and evolution are science-oriented. This is shown by this quotation from January/February 1978 issue of the campus newsletter *Students for Origins Research*:

"The format of the debate usually centers around a resolution such as 'The theory of special creation is superior to the theory of evolution as an explanation for scientific evidence related to origins,' with the scientists debating either affirmative or negative. Most debates have included discussion of thermodynamics, probability, the fossil record, radioactive and

young age dating methods, mutations, natural selection, plant and animal breeding, homology and embryology."

This same newsletter reported that last year 5,000 people attended such a debate at the University of Minnesota. Some 2,000 were at similar debates last year at Colorado State University and again at Texas University. Over 1,000 attended debates at each of the following: University of Maryland, Ohio State University, San Diego State College, University of California at Los Angeles and Santa Barbara and Chico State College. Other campuses doing this include University of Oregon, University of California at Berkeley, University of Kansas and Georgia State University.

Format Used by Jehovah's Witnesses

Frequently Jehovah's Witnesses visit high schools and colleges to discuss creation. When they do they do not use debates as the format. The very structure of debates makes it difficult for people to change their view without losing face. It is a contest to see which side can win. Emotions rise, strong words are used, dogmatism takes over and calm, logical reasoning cannot function. Often both sides leave as they came—each side convinced that it is right.

Jehovah's Witnesses believe that a different format is more beneficial and comes closer to this Biblical counsel: "The Lord's servant must not be a man of strife: he must be kind to all, ready and able to teach: he must be tolerant and have the ability gently to correct those who oppose his message. For God may give them a different outlook, and they may come to know the truth." (2 Tim. 2:24, 25, *The New Testament in Modern English*, J. B. Phillips) So Jehovah's Witnesses usually present their views in a talk, then open the meeting to questions. Many times this discussion period lasts longer than the lecture.

"Wisdom is proved right by its results," Jesus said. (Matt. 11:19, *The New English Bible*) The results Jehovah's Witnesses have had with this method prove its worth. One lecture-question session was arranged by a student at Brooklyn College. He discussed with his geology professor, who was also head of the science department, some points about creation that he had learned from the Witnesses. The professor decided that his students should hear these points, and he invited the Witnesses to speak. Two came, one of them a biology teacher and author of a college biology textbook. Both spoke, then answered questions, and the 200 present seemed satisfied that evolution was only an unproved theory. Most of the questions were on the Bible. The student who arranged for the meeting is now a full-time minister of Jehovah's Witnesses.

Two girls, students at a Florida university, discussed evolution. One was a Witness and her talk about creation brought this reply from the other girl: "What you say about a better world sounds good, but I have to believe in the theory scientists and professors believe in. After all, they are knowledgeable in this field. I can't believe that you people know more than they do. I have to go along with them." Both then attended one of the lecture-question sessions by one of the Witnesses, and afterward the doubter exclaimed: "I never knew that the evolutionists only have an unproved theory that is riddled with so many unanswered questions!"

"Why Don't They Teach These Things in Class?"

Again in Florida, a teacher and her husband, a professor, along with a student friend, attended one of these sessions. Afterward the student said: "This has been an eye-opener! Why don't they teach these things in class?" A few months later the student and the teacher were baptized as

Witnesses, and her husband, the professor, was studying the Bible regularly with the Witnesses.

At a Catholic university in Maryland, the head of the biology department read the book *Did Man Get Here by Evolution or by Creation?*, distributed by Jehovah's Witnesses. He was so impressed that he requested that a Witness address his students on creation. Forty students attended, plus three professors and their wives and several nuns. At the conclusion of the question session, several students requested home Bible studies, as did two of the nuns; and the professor who first asked for the meeting wanted to know how he could order a supply of *Did Man Get Here by Evolution or by Creation?* From now on, he said, their biology course would include points on creation along with evolution.

A few years ago *The American Biology Teacher*, the journal of the National Association of Biology Teachers, ran an article by a creationist who debated the subject at colleges. In a later issue, January 1971, the "Letters to the Editor" section printed rebuttal letters from biologists. One by Harvard Professor Ernst Mayr opened with the well-worn pitch: "I do not know of a single well-informed person who questions the factuality of evolution." In the second paragraph he asserted that every well-informed biologist shared the view that evolution "is considered by all those entitled to judgment to be a fact for which no further proof is needed." But farther along he inconsistently said: "It is virtually never possible in science to prove anything." However, the fact is that many truths in science have been proved by both observation and experiment. It would have been more appropriate for the professor to say: 'It is virtually never possible in evolution to prove anything.' Mayr's closing words on evolution echoed

his opening assertion, "... it is accepted by every well-informed biologist."

Along with Mayr's letter, this footnote appeared:

"Teachers who wish to become more familiar with creationists' arguments should read *Did Man Get Here by Evolution or Creation?* [sic], published in 1967 by Watch Tower Bible & Tract Society and available locally from Jehovah's Witnesses. This 192-page book includes an extensive bibliography.—*The Editor.*"

Creation Passes Its Exams

Creation says that life originally came from Jehovah God. He created many different family kinds, and each of these brought forth offspring "according to its kind." Life comes only from life. Within the family kind there is variation, but viable changes are limited to the family circle. (Genesis, chap. one) Evolution claims that life came into existence by chance, then by chance changed into new kinds, all the way from amoebas to men.

As far as we know, life comes only from life. As far as we know, organisms reproduce after their kind, no variations going beyond the family kind. These are facts observed and also confirmed by experiments. The spontaneous generation of life has not been observed; nor has it been accomplished by experiments. One kind has not been observed changing into another kind; nor can it be made to happen in experiments. Evolution cannot be verified by the scientific method. Not even by the intervention of human intelligence can life be created or changed into a different kind.

Many fossils within the family kinds have been found, but none showing the millions of changes that would have had to take place to turn one kind into another. Faith alone supports the evolutionist's belief in spontaneous generation of life. Also required: faith in fossils that he has never found and faith in mutations that he has never seen.

EVOLUTIONISTS SAY:

Radio signals of a few hundred "bits" of information that produce this design could come only from an intelligent source

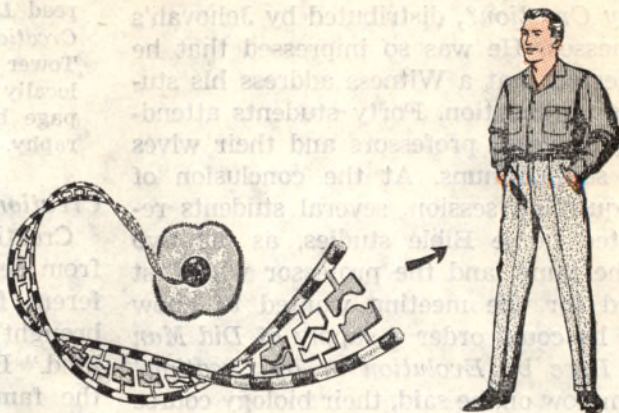


Evolution is a philosophy, but it masquerades as a science. It puts faith in "chance" as creator of the millions of complicated, purposeful designs in living things. It calls to mind certain ones of ancient times who set aside Jehovah and became "those setting in order a table for the god of Good Luck and those filling up mixed wine for the god of Destiny."—Isa. 65:11.

There is a glaring inconsistency in the thinking of evolutionary scientists. It is in the area of design and order. For example, proposals have been made to beam radio signals to some of the nearer stars in the hope of communicating with a distant civilization assumed to inhabit a hypothetical planet there. If these signals show a pattern instead of being just a random mixture, it would indicate an intelligent source. Let Dr. Carl Sagan of Cornell University explain this:

"It is easy to create an interstellar radio message which can be recognized as emanating unambiguously from intelligent beings. A modulated signal ('beep,' 'beep-beep,' . . .) comprising the numbers 1, 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, for example,

They also say that the billions of "bits" of information in DNA that produce a man require no intelligence, just happen by chance



consists exclusively of the first 12 prime numbers—that is, numbers that can be divided only by 1, or by themselves. A signal of this kind, based on a simple mathematical concept, could only have a biological origin. . . . But by far the most promising method is to send pictures."—*Smithsonian* magazine, May 1978, pp. 43, 44.

One suggested picture to send would show a man, woman, child, the solar system and several atoms—all accomplished by sending a series of dots and dashes, each one called a "bit" of information, and requiring 1,271 bits in all. An even more complicated picture has already been sent to star cluster M13, in 1974.

Now, the point is this: if 1,271 bits of information in a certain sequence suggested order and design and "unambiguously" proved an intelligent source, what about the some ten thousand million bits of information encoded in the chromosomes of every living cell?

The DNA in a fertilized human egg cell contains, not just a thousand or so bits to convey a simple, crude black and white picture, but billions upon billions of bits of information that determine the growth

of a three-dimensional, full color, flesh and blood, live human! And the egg cell does not have to wait for some scientist to figure out what all the genetic symbols represent and organize the information to draw up plans for the baby. No geneticist knows enough to have the foggiest notion of how to start. Yet, the tiny egg cell proceeds to do the whole job without any outside supervision!

Now, what do scientists think of this genetic code that repeats itself trillions of times in every one of the cells of the growing human creature? They say that it just happened. Then they say that a radio signal from outer space, containing a mere few hundred bits of information, would be sensational and would prove that it came from an intelligent source—that it could never happen by chance! But they refuse to admit that the millionfold stronger proof from the inner space of the genetic code bespeaks a supremely intelligent Com-

poser of the information. Now what do you think? That the comparatively few simple bits of information in a radio signal prove an intelligent source but that the awesome complexity of purposeful design in living organisms just happens? How foolish to think so!—Ps. 14:1.

Creation fits the known facts of science. Genesis, chapter one, lists eleven events or conditions of Jehovah's creative work. Science recognizes the events as stages in the development of the earth and of life on it, and also acknowledges the correctness of the order of the listing in Genesis. What are the chances of the Bible writer guessing this? One in 39,916,800! Does not this argue that man has already received communication from outer space? Has not Jehovah already communicated with men by inspiring certain ones to write the Bible?

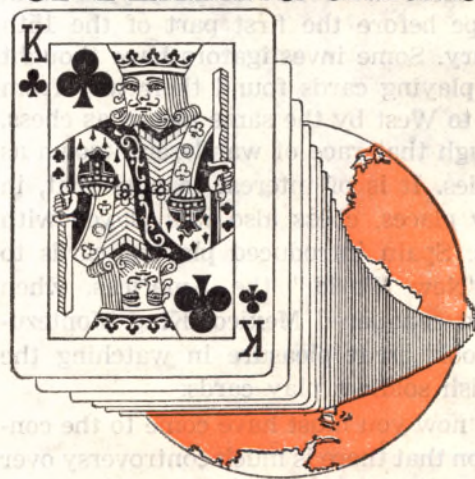
When creation goes to college, it passes its examinations. Evolution can pass only if it is the teacher's pet.

CARDS, anyone?" In any language, this expression would easily be recognized, for playing cards are international and can truthfully be said to span the globe from north to south and from east to west. From the barren, lonely outposts at the poles to the steamy jungles of the equator, you can find a pack of cards. An interesting observation is that cards have had a tremendous influence on human affairs. Decisions, whether successful or otherwise, have been made with the aid of playing cards. Fortunes have been won and lost at the turn of a card.

What is it about a pack of cards that promotes such popularity, such universal amusement? Let's consider some of the facts.

First and foremost would be its size and convenience. A modern pack of playing

THE ORIGIN OF PLAYING CARDS



cards requires very little storage space and weighs only a matter of ounces. Next would be the number of players required for a game. Unlike most games, cards can be played by as few as one person. There is the game of Patience, or Solitaire as it is known in the United States, that can fill many lonely hours and form a welcome pastime for those forced to spend long periods of time by themselves. Since card games are universal, one can usually find someone, old or young, with whom to play.

You might well ask at this point: 'Where did this popular pastime originate? Who invented it, and when? Has it always been in its present form?' These are intriguing questions. Shall we investigate?

The New Funk & Wagnalls Encyclopedia says that playing cards originated in Hindustan about 800 C.E., with the king, queen, and jack dating from the Middle Ages. A Chinese dictionary of 1678 C.E. states that they were invented in the year 1120 B.C.E. for the amusement of Seun-Ho's concubines. Some antiquarians say that playing cards were introduced into Europe by the invading Saracens who crossed the Mediterranean in the year 711 C.E. Others claim that the Crusaders brought back playing cards from the East. There is some agreement, however, on the fact that cards were not commonly used in Europe before the first part of the 15th century. Some investigators have thought that playing cards found their way from East to West by the same means as chess, through that race of wanderers known as Gypsies. It is of interest to note that, in many places, chess also was played with cards. Spain introduced playing cards to the "New World," the Americas, when Cortez conquered Mexico. King Montezuma took great pleasure in watching the Spanish soldiers play cards.

By now you must have come to the conclusion that there is much controversy over

the origin of playing cards when it comes to pinpointing the definite time and place. But regardless of the difference of opinion, playing cards evidently originated in the East. A remarkable similarity is noted between the early Chinese paper money of the Tang Dynasty and the Chinese playing cards.

Ancient Development

Regardless of what part the Gypsies played in introducing playing cards to the West, it is of interest to note that those people primarily used them for the purpose of fortune-telling, or divination. Today cards are used for this purpose. The ancient Tarocchi pack of cards numbered 78 and were without suits, numbers, or pips such as we have today. During the 14th century, the numbers and pips were introduced in Europe, using all 78 cards, of which 22 were face cards. The 22 Tarots, or special face cards, were used in divination. They represented allegorically the material forces and natural elements, virtues and vices. The designs included such things as a king holding a star in his hand, Death wearing a cardinal's hat and mantelletta, two cupids, a knave with coins, and characters from fairy tales. Even proverbs were illustrated.

One of these special cards was known as the fool, or joker. This card exercised a very powerful influence over the outcome of the divination, since it served to intensify or multiply the meaning of the card next to it. If good fortune was indicated and the fool came up next, the good fortune supposedly was multiplied. On the other hand, if bad news was indicated, the joker would intensify that bad news, which would overshadow any good news that might be foretold during the session.

The remaining 56 cards were divided into four suits of cups, coins, swords and cudgels. These represented all classes of

people. Cups, or vases, represented the priestly class or rulers. The coins represented the merchants. The swords clearly indicated the warriors. Finally, the cudgel pointed to the farmer or the worker. Each suit had four court cards comprised of a king, a vizier, a knight, and a jack, along with 10 numbered cards. The four court cards represented various ranks or levels of authority. For example, the king was the royal ruler, the vizier was a high official, the knight was of military rank (such as chief commander or general), and, finally, the jack was a leader among men. These four suits covered appropriately all classes of human society, both ancient and modern, all competing with one another, manipulating one another in their efforts to come out ahead of their fellows.

The similarity to human affairs is clearly seen in the game of cards. Each player received 14 assorted cards representing perhaps some merchants (coins), some farmers (cudgels), some warriors (swords), and some rulers (cups), and maybe a king as royal ruler and a knight as military commander to boost his hand. To win, he had to deploy with skill his manpower as represented by cards.

Modern Development

The *Encyclopædia Britannica* shows that the details of the pack varied as to design and number. Among the Anglo-Saxons, the pack consisted of 52 cards with four suits of 13 each. In Italy, it was comprised of 36 cards, and the older German packs had only 32 cards. In China, the early Portuguese missionaries found that the pack consisted of 30 cards, with three suits of nine each and three superior cards. The French deck of 52 cards, now standard, evolved from the now numbered cards of the Tarot deck. Modern games requiring a short deck are played by removing cards from the standard deck.

A host of subjects has been used by the nations on the face of the cards—such things as horsemen, elephants, hawks, bells, flowers, birds and many others. In the "New World," the cards manufactured in New York in 1848 C.E. had neither kings, queens nor jacks. Instead, the President of Hearts was George Washington, the President of Diamonds was John Adams, that of Clubs was Benjamin Franklin, and that of Spades was Lafayette. Rather than queens, these cards had the goddesses Venus, Fortune, Ceres and Minerva. The jacks were represented by Indian chiefs.

Ancient packs of cards were printed from wood cuts and were hand-painted. However, during the 15th century, the German invention of engraving was perfected for playing cards, replacing the hand-painted ones. Our modern four suits originated in France during the 16th century. The clover-shape trefoil that we call "clubs" was *trefle* in French. The tip of a pike, now called "spades," was *pique*. The third suit was called *coeur*, the French word for "heart." The fourth suit was called *carreau*, meaning square, but this was translated "diamond" because the spot was diamond-shaped.

The size of our modern playing card, three and a half inches by two and a quarter inches (8.9 x 5.7 centimeters) was derived also from the French style, as the Chinese playing card was long and narrow, and the Indian type was round. As already noted, the close connection between chess and cards is again seen in the two colors red and black, which dominate the four suits.

One of the features that make playing cards universally attractive is the great variety of games and the variation in the number of players using either single or double packs, with each game having its own set of rules. Today most of the games formerly played are unknown, their names

being found only in antiquarian works. Games played in the 18th and 19th centuries still survive, such as Piquet, Loadam, Noddy, Macke, Ombre, Gleek, and Post and Pan. Today card games can be categorized into four groups (to name a few among these): (1) Gambling games—Poker, Fan Tan, Faro, Baccarat, Black-jack; (2) party games—Beggar-My-Neighbor, Cassino, Old Maid, Rummy; (3) ranking games—Napoleon, Five Hundred, Ombre, Skat, Spoil Five; and (4) solitaire games, of which there are more than 350 variations.

The number of players varies with the different games. Cribbage can be played with two or four persons; Poker can have ten; Canasta has from two up to six players; whereas Whist and Bridge can be played by 20 to 40 persons divided into fours, each winning pair moving up to another table.

The origin of Whist is obscure. The game was first referred to in 1529 C.E. Edward Hoyle published a short treatise on Whist in 1742 C.E., but the popularization of the game among the philosophical society took place in the decade following 1860 due to the labors of Henry Jones and William Pole.

According to Funk and Wagnalls *Encyclopedia*, Bridge is another variation of Whist, making its first appearance in Greece early in 1880. It was known as Russian Whist in London, England, in 1886, where it became more and more popular, and by the year 1900 it had displaced the old game of Whist.

Early in the 20th century, Auction Bridge developed. In this game the players bid against each other for the right to declare the trump suit. Each bid was an undertaking to win the specified number of tricks. Duplicate Bridge, like Whist, can be played by 20 to 40 players divided

into fours, each winning pair moving to another table. Finally, Contract Bridge was developed in 1925 by an American of the famous Vanderbilt family.

Probability Involved

The variation feature of playing cards would not be complete without mentioning the probability factor associated with the 52 cards. The *Guinness Book of World Records* states the mathematical odds against dealing 13 cards of one suit as being 158,753,389,899 to one. The odds against all four players receiving a complete suit are 2,235,197,406,895,368,301,559,999 to one.

So, while considerable skill is involved in playing cards, probability of chance plays a large part. This is undoubtedly one of the reasons why card games are popular—they appeal to a wide spectrum of players, some games being designed for the skillful, others for those who merely want to relax and pass the time. Too, cards provide an inexpensive diversion.

However, when one hears the popular call, 'Cards, anyone?' it is good to keep in mind that card games, like all other forms of entertainment, can consume a lot of time. When any amusement or entertainment goes beyond what is actually good for relaxation, the time used becomes wasted time, time in which more important matters should be cared for. As a consequence, the individuals involved suffer, often both materially and spiritually. A consciousness of this fact, along with the exercise of self-control, will prevent a person's letting the entertainment become a snare to himself and others. And the use of cards in fortune-telling is condemned by the Bible, which tells us that all forms of divination and spiritism are detestable in God's sight.—Deut. 18:9-14.

How We Survived the Bloodbath in Kolwezi

Two missionaries of Jehovah's Witnesses survive the ordeal, but suffer a tragic loss



THINGS seemed normal as we retired to the bedroom of our missionary home on that Friday night, May 12. We lived

in Kolwezi, a mining town in southern Shaba province, Zaïre.

It was a nice town, inhabited by some 120,000 people, including 4,000 foreigners who worked mainly at the huge copper mines in the vicinity. Copper provides the main livelihood of Zaïre. Little did we know that in the ensuing hours and days events to take place would make headlines around the world. One happening in particular would affect us for the rest of our lives.

At dawn the next morning, Saturday, May 13, we were awakened by a sharp "rat-tat-tat" that shattered the morning stillness. At first we wondered what it was. Then our hearts pounded as we realized it was machine-gun and rifle fire. What was happening? An army mutiny? A rebel attack? Soon the din of fighting reached us and bullets whined over our house. Some thudded into the tall trees in the yard.

Quickly we filled the bathtub with water and baked some bread in case the water and electricity would go off. We heard loud voices in the street and peeped out a crack in the garage door to the gate. A group of soldiers with heavy backpacks were passing. They spoke Swahili. Were they Katangan rebels, the same who had attacked Shaba province (ex-Katanga) last year? They generally speak Swahili, whereas government troops speak Lingala. The Katangans seek to take over what they consider to be



their province. Or, if not this, they at least want to force

a change of the central government.

Throughout Saturday and Sunday the noise of fighting continued, some of it farther away, some in the houses behind ours, where loud noises of machine-gun and rifle fire erupted periodically. As we had feared, the water did go off, but the electricity continued sporadically. We stayed close to the radio trying to find out what was happening. As a precaution against stray bullets, we put a mattress and pillows over our large bedroom windows.

Our Bedroom Demolished



In the beginning of the afternoon on Monday the two sides began trading gunfire again. We confined ourselves to our semibarricaded bedroom. About two o'clock a thunderous explosion shook the house. Suddenly, a second deafening explosion rocked the bedroom. It was followed by a third thunderous blast. For several seconds we were motionless, dumbfounded, too shocked to realize what was happening. I yelled to my wife to take refuge in the center hallway. Dust and smoke in the bedroom obscured the devastation. We were bleeding, and headed for the bathroom to check our wounds. My wife was bleeding from the shoulder, myself on the arm, and we both had other small punctures here and there.

Mortar bombs or rockets had burst through the roof, one right over where I had been seated working. Flying pieces of shrapnel had sprayed the room. A few small pieces had hit each of us. We cleaned the wounds with alcohol and tried to pick out the lead with a clean razor and needle. Then we bandaged the injuries.

Returning to our bedroom, we found it almost completely demolished. There was a gaping hole through the ceiling and the roof over my desk. The room was filled with rubble and pieces of metal from the mortar bomb and the tin roof. There were small holes in the walls, in the rug at our feet, through the blankets and personal things on the bed, in the furniture and even in our leather briefcases. But, amazingly, we each had only three superficial shrapnel wounds.

Fortunately, the bombing stopped soon thereafter and we were able to start to build a shelter in the third bedroom that contained cartons of literature. We piled the cartons up to cover some of the windows and covered the rest with a spare mattress. We pulled our bed from the demolished bedroom, put it in the most sheltered corner and built a covering over it with sheets of plywood supported by cartons at the corners.

Series of Explosions

The following two days we spent each afternoon crouched under our makeshift bomb shelter as mortars and rockets, one after the other, burst with deafening explosions in our yard and nearby. There was never a warning—just the sudden blast and the sound of falling debris. Machine-gun and small-arms fire continued all the while. We heard the window break behind the barricade of cartons and mattress as a mortar shell exploded just outside the room. Fortunately, the walls of the house were built of sturdy brick.

Another shell burst just outside the kitchen, breaking the windows. Two more exploded in the backyard, breaking the windows in the main literature-depot room and gouging many small holes in the cement wall of a small building out back. In the bathroom our bathtub water supply was filled with bits of broken glass and plaster. Another rocket exploded in front of the house, covering the outside wall with shrapnel holes and blowing the bits of glass remaining in the frames inward across the entire front of the house. In the yard, from time to time, small branches rained down as stray bullets cut through the trees.

During the lull in the fighting, our neighbor from across the road came over to ask what we knew about medicine. A mortar or rocket had exploded near his kitchen window and had badly injured the back of his wife's head. She was obviously in a state of shock, but it was impossible to evacuate her to a hospital because of the gunfire heard in that direction. We were able to help only with some penicillin against infection of the wound.

Sometime during Wednesday afternoon we no longer heard any return fire from the Zaïre army positions near our house, although mortars or rockets continued to explode in the neighborhood.

By Thursday it was much calmer near our home, except for an occasional outburst from a machine gun, isolated rifle shots and mortar explosions in the distance. I heard the noise of a vehicle in the street and I carefully peeked around the corner hoping that someone friendly might be passing. To my dismay, four Katangan



soldiers stood at the gate. They ordered me over, pointing a gun at my head, and instructed me to open the gate.

I was uncertain whether they wanted to set up a gun position behind our high brick wall or whether their intentions were to steal and molest. To give me time to think, I pointed to the two chains and padlocks on the gate and told them I would have to get the keys if the gates were to be opened. I went into the house, and we quickly barricaded the doors. Would they try to break through the gate or climb over the wall? Oh, how we prayed to Jehovah during those minutes! They fired into the air. After a time they continued down the street.

We remained in the house and maintained the barricades out of fear of individual undisciplined soldiers. We had already heard on the radio of assassinations of white expatriates. Sometimes the rebels broke into houses to kill; other times, however, only to steal without causing personal harm. It was important not to oppose them openly.

Friday, I wanted to check on the injured woman across the road. No sooner had I stepped outside the house than a sniper's bullet whistled past my head. We remained inside, praying and reading the Bible.

On Saturday help came unexpectedly as Belgian and French troops moved into the town to evacuate all expatriates. Previously, Zairian paratroopers had recaptured the airport. We had just a few minutes to grab a few things—only what we could carry—and rush to the airport. Everything else was abandoned. On the way out, we briefly checked on a few of our Christian brothers. They were safe, but low on food.

The atmosphere was tense along the route, as rebel forces had not withdrawn very far. Evident everywhere were signs of

war—bodies of dead soldiers, damaged vehicles, gun casings, pockmarked buildings. At the airport we could see burned helicopters and planes, exploded and unexploded mortar bombs on the ground, and the evacuation force surrounding the road and the airport.

Hundreds of Europeans were flocking to the airport, abandoning their cars there. After a wait by the runway, we were flown in Belgian army transport planes to Kamina air base. From there Sabena, the Belgian airline, flew the refugees to the capital for eventual flight to their respective nations.

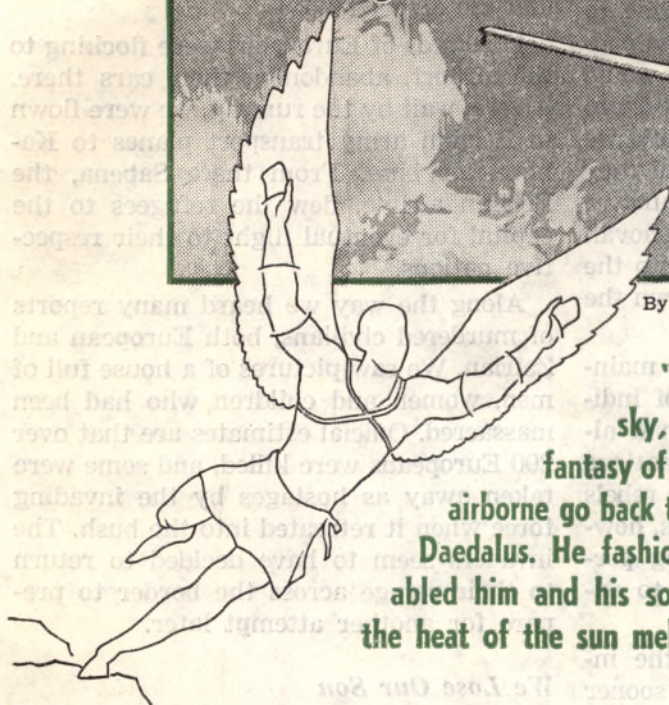
Along the way we heard many reports of murdered civilians, both European and Zairian. We saw pictures of a house full of men, women and children who had been massacred. Official estimates are that over 200 Europeans were killed, and some were taken away as hostages by the invading force when it retreated into the bush. The invaders seem to have decided to return to their refuge across the border to prepare for another attempt later.

We Lose Our Son

We arrived in Kinshasa, but our ordeal was not over. On Tuesday, my wife, almost six months pregnant, having endured the terrors, the dangers and the pressures of the war, gave signs of going into labor. She was taken to the hospital. On Thursday, she gave birth prematurely to our tiny 750-gram (26.5-ounce) son. He only survived for four tense days, too small to breathe or to digest food in his tiny stomach.

How wonderful it will be when Jehovah makes wars cease to the extremity of the earth. (Ps. 46:9) We and other Christians were close to death several times. Only Jehovah's aid and guidance could help. Such experiences affirm our faith in him and the effectiveness of prayers.—*Contributed.*

Imitating the Way of Birds



By "Awake!" correspondent in Japan

"I want to fly like a bird, float on the blue sky, touch the white clouds." Is this the faraway fantasy of long ago? Perhaps. Man's dreams of becoming airborne go back to the ancient Greek myth about the inventor Daedalus. He fashioned wings of feathers and wax, which enabled him and his son Icarus to fly like the birds. But because the heat of the sun melted the wings, Icarus plunged to his death.

However, in 1680, the impossibility of this kind of flight was recognized. The calculations of the Italian mathematician Giovanni A. Borelli showed that, if man were to depend on the strength of his arms flapping like a bird in order to fly, he would never get off the ground.

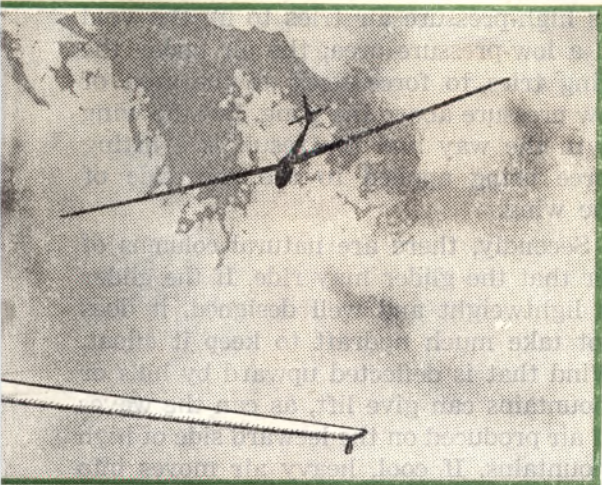
It was not until 1783 that the first bird's-eye view of terra firma was enjoyed by two Frenchmen. They sailed over Paris in a linen balloon. Years later, experiments with kites and gliders led to the marvels of powered flight.

Common today are jet planes carrying almost 500 passengers or 100 short tons

(90 metric tons) of cargo and traveling at speeds of 600 miles (966 kilometers) per hour. Speed records in excess of 2,000 miles (3,200 kilometers) per hour have been set, and nonstop distance flights of over 10,000 miles (16,000 kilometers) have been made. Although many stand in awe of these advances in aviation, others find contentment and much enjoyment in noiseless flying at low altitudes (2,000 to 3,000 feet; 600 to 900 meters) and at low speed. This is the world of gliding.

Use of Gliders

Gliders were first used for flight experimentation and have since been utilized for



training, transport, combat, research and sport. Gliding for sport is very popular in the United States, Germany and Australia, where glider records have been set. For example, the world altitude record of 46,267 feet (14,102 meters) was set in 1961 in the United States; the longest nonstop straight-line distance of 907.7 miles (1,460.8 kilometers) was attained in Germany; and the fastest speed, 87.43 miles (140.7 kilometers) per hour, over a triangular course of 500 kilometers (311 miles) was achieved in Australia.

In Japan, there are close to 3,000 gliding enthusiasts, half of whom are students. According to a newspaper report back in 1975, two experienced pilots were training to launch an advanced type of glider from the summit of 3,776-meter (12,388-foot) Mount Fuji for a trans-Pacific flight. Some believe that, if needed oxygen and food could be carried and adequate altitude could be attained, theoretically a trans-Pacific flight would be possible. However, plans for such a flight have been abandoned. Because government regulations limit the flight ceiling to about 450 meters (1,470 feet), no world records are being set here. Nevertheless, training and pleasure flights are continuing at a gliderport

in Kambara, a small fishing town nestled between the mountains and the sea near the base of Mount Fuji. Would you like to make an armchair visit to this gliderport and find out just how these motorless planes continue to give man his closest approach to imitating the birds?

Visiting the Gliderport

On our first look into the hangar, we see two single-engine airplanes, to be used for towing the gliders into the air, and two motor gliders—each having a small 25-horsepower engine that can be turned off when the plane is airborne. Where are the other gliders? We crane our necks as the doors of the second story are opening and see them lined up inside. Due to their weighing only 250 to 350 kilograms (550 to 770 pounds) each, they can be lifted by power hoists and lowered to the ground. They are pushed to the runway by hand. To one who may be accustomed to the noise and bustle of a modern big-city airport, this gliderport may not be too impressive. The narrow runway is gravel and the radio tower is mounted on the roof of a van that is driven to the runway area. But the excitement of taking to the air with the birds is just the same, if not greater, because the thrills of gliding are enjoyed in silence.

As we look around, we notice gliders of various shapes. Some look rather cumbersome, whereas others are sleek and streamlined. What accounts for the differences? Primary gliders are just that—gliders. They have larger wing surfaces, but their design and weight permit them only to glide back to earth once they are released from the tow plane. The sleek sailplanes, however, are designed to soar. That is, to gain altitude, they can utilize winds blowing up the slopes of mountains, as well as rising columns of warm air called "thermals." It is this type of soarplane that can

travel great distances and stay up in the air for hours at a time.

Just what enables these man-made birds to float in the sky? A basic understanding of the principles of flight will help us to understand.

Principles of Flight

as They Affect Gliders

There are four forces that act on an airplane in flight: (1) gravity (the natural force acting on its weight to pull it to the ground), (2) lift (opposite of gravity and produced by the design of the wings or updrafts of air), (3) drag (air resistance opposing forward movement), (4) thrust (forward power to overcome drag and propel the airplane forward). To get a glider off the ground, the initial thrust is provided by either towing it with a car or an airplane or pulling it with a winch and cable mounted at the far end of the runway. Once it is separated from this source of power, lift and the glider's aerodynamic design counteract gravity and drag, keeping the glider in the air. Lift is provided by (1) the curved design of the wings and (2) the rising currents of air.

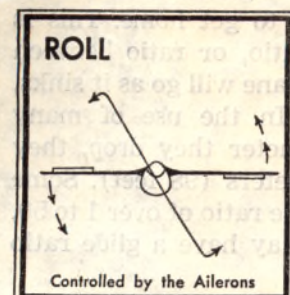
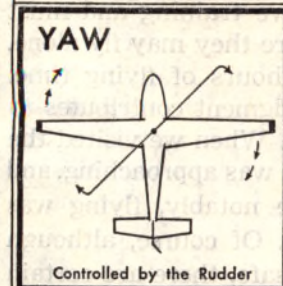
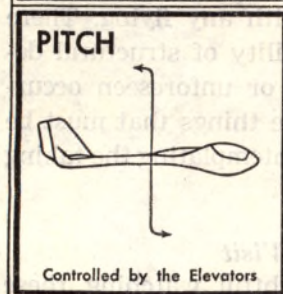
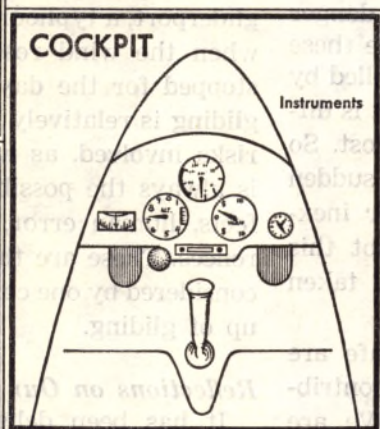
From studying the shape of birds' wings man came to recognize that a curved shape would provide lift. Just what is involved in the design of the wing? The bottom surface of the wing is flat and the top surface curved, tapering toward the back or trailing edge. When a glider is stationary, the air pressure on the top and the bottom of the wing is the same. But when it moves forward, only the air pressure on the bottom of the wing stays the same. The air across the top curved surface has to travel a greater distance in the same time that it takes the air to pass by the underside of the wing. Hence, the air passing over the top of the wing moves faster and is thinned out, causing the pressure to drop.

As high-pressure air tries to fill the void in a low-pressure area, the air under the wing tries to force itself to the area of low pressure above the wing. But the wing is in the way and the result is a lifting force being applied to the underside of the wing.

Secondly, there are natural columns of air that the glider may ride. If the glider is lightweight and well designed, it does not take much updraft to keep it afloat. Wind that is deflected upward by hills or mountains can give lift, as can the waves of air produced on the leeward side of high mountains. If cool, heavy air moves into an area of warmer air, the warmer air is forced upward and these "shear lines" can be used for lift. Also, certain land surfaces, such as plowed fields or the asphalt and concrete of cities, absorb heat from the sun, causing warm air to rise. Sailplane pilots look for soaring birds or cumulous clouds, for these often indicate the presence of a "thermal." By circling in the thermal, the sailplane pilot gains altitude, and then takes off in another direction, looking for another updraft.

Flying the Glider

But what gives the glider maneuverability? How does the pilot control his sailplane? There are three basic movements to a glider: (1) pitch (movement on the lateral axis from wingtip to wingtip), (2) roll (movement on the longitudinal axis running from nose to tail), and (3) yaw (movement on the vertical axis through the center of the fuselage). Pitch is controlled by the up-and-down movement of the "elevator" on the trailing edge of the horizontal piece of the tail assembly. Roll is controlled by ailerons, which are movable parts of the trailing edge of the wings. To roll to the left, the left aileron goes up and the right aileron goes down. Rolling to the right requires just the op-



Rudder

Flap

Elevator

Spoiler

Aileron

posite. Yaw, or left and right movement, is governed by the rudder, the trailing edge of the vertical tail assembly.

This may sound complicated, but a look at the glider cockpit shows us that the operation is relatively simple. A stick coming up from the floor controls the pitch and roll. Push it forward and the nose goes down. Pull it back and the plane starts to climb. Move it to the left and the left wing dips to start a left roll. Moving it to the right causes the ailerons to move in the opposite direction, and the plane rolls right. The left and right movement of the

rudder is controlled by the two foot pedals. Push the left one and the glider moves left; push the right one and the glider goes right. A left or right turn, or bank, is made by a combination of a roll and rudder movement in the direction that you want to go.

Also, in the cockpit, we see a knob for releasing the tow rope and a lever for controlling the flaps and spoilers. Flaps are the parts of the trailing edge of the wing nearest the fuselage and are extended downward mainly to reduce speed on landing. Spoilers serve the same function, but

rise upward from the center of the top surface of the wings. There are relatively few instruments—an air speed indicator, an altimeter, a compass, and a variometer (a device showing the rate at which the glider is rising or sinking). Most gliders are equipped with a small radio.

How Safe Is Gliding?

The past few years have seen an increase of enthusiasm for gliding, especially in the use of relatively inexpensive kite-like hang gliders. Some of the sailplane pilots that we talked to were quick to distinguish between sailplanes and hang gliders. One pilot, with over 30 years of experience, noted that he could not recommend hang gliding because of the danger involved. He explained that because these gliders lack stability and are controlled by movement of the operator's body, it is difficult to regain control once it is lost. So the hang glider is vulnerable to sudden gusts of wind and the inability or inexperience of the operator. No doubt this continues to contribute to the toll taken by hang-glider crashes.

What about sailplanes? How safe are they? Design and controllability contribute to the safety of sailplanes. We are told, at a free one-day gliding course sponsored by the Shizuoka Prefecture Aeronautic Association (Japan), that if you lose control of a glider, probably the best thing to do is to let go of the stick and the plane should right itself, as it is designed that way. Also, the president of the association mentioned that he feels safer riding in a glider than he does driving to the gliderport in his car. Gliders are considered by some to be safer than airplanes because they are not dependent on an engine, which can fail. Of course, if a glider pilot gets too far from home and runs out of updrafts, he will have to look

for a flat, open area on which to land. A general rule of thumb is that if the gliderport is within a 30-degree radius of the glider, it is possible to get home. This is because the glide ratio, or ratio between how far forward a plane will go as it sinks, is relatively high. In the use of many gliders, for every meter they drop, they move forward 30 meters (98 feet). Some sailplanes have a glide ratio of over 1 to 50, whereas airplanes may have a glide ratio of only 1 to 10.

Glider pilots receive training and must obtain a license before they may fly alone. This takes over 50 hours of flying time. In addition, good judgment contributes to the safety of gliding. When we visited the gliderport, a typhoon was approaching, and when the wind rose notably, flying was stopped for the day. Of course, although gliding is relatively safe, there are certain risks involved, as with any flying. There is always the possibility of structural defects, human error, or unforeseen occurrences. These are the things that must be considered by one contemplating the taking up of gliding.

Reflections on Our Visit

It has been delightful watching these fiber-glass and metal "birds" as they cast shadows across the ground. Then, too, it is interesting to see how, after 70 years of aviation progress, men still find pleasure in the simpler beginnings of motorless flight.

Also, we have learned humility as we have seen how man can learn from the birds. The very design of the sailplane's wings is but a copy of those of soaring birds. As we look skyward and see the sailplane sharing the same thermal with five buzzards, we feel that no doubt there is yet much to be learned as man imitates the way of the birds.

SPEAKING WIRES of the DEEP



**By "Awake!"
correspondent
in Hawaii**

MORE than a century ago a fisherman trawling in the coastal waters of France hauled in what seemed to be a new kind of seaweed. Strangely, it had a metal core. By cutting off a piece to show his friends, he inadvertently wrecked a 10-year project. Many financiers, as well as the English and French governments, had poured more than a million dollars into an underwater telegraph cable that would span the English Channel. On September 1, 1850, it was finally laid. This cable was the 'new seaweed' that was cut *the very next day!*

Telegraph Lines Cross the Seas

By 1850 the six-year-old electric telegraph had spread like wildfire over North America, to England and to many parts of Europe. Although a great success on land, the aerial wires always came to a dead halt at the ocean's edge. Many brilliant and imaginative minds became absorbed with solving this problem.

The Straits of Dover cable had been insufficiently protected. Only the shore ends were armored in lead tubes. Although it functioned somewhat until the fisherman cut it, the signals from both sides of the Channel were jumbled. It was not appreciated that even though properly insulated, cable becomes greatly altered when submerged. This problem of signal retardation was to baffle many cable engineers for a while. However, in 1851, a real armored cable that was much more successful than its predecessor was laid across the Channel. In just a short time, a network of submarine cables spread over the Mediterranean seabed connecting Europe with Africa and the intermediate islands. With such successes, thoughts soon turned to spanning the seabed of the mighty Atlantic.

The First Transatlantic Telegraph Cable

Although England pioneered in submarine cable engineering, American businessman Cyrus W. Field persisted in endeavors that finally resulted in the laying of a successful Atlantic cable. In the end, it became a joint effort of the British and American governments. Some of the world's most noted financiers, oceanographers, telegraphers and scientists on both sides were brought into this enterprise. The talents of such men would prove to be indispensable because of the deep trench-

es encountered in the mid-Atlantic. Here the earth's greatest mountain range spreads out 1,000 miles (1,600 kilometers) long and 500 miles (800 kilometers) wide, completely submerged.

Had Field and his associates known in advance the many years of financial problems and cable-laying disasters that lay ahead, they may well have resigned during their earliest attempts. Cable breakage, adverse weather and the fouling of cable in the paying-out gear of the ships constantly hampered the project. Sometimes hundreds of miles of cable, costing a fortune, were left broken on the ocean floor.

The old problem of signal retardation had to be solved. Someone had to find out how long it would take for a signal to reach the far ends of the cable and how much electricity would be required to fill the cable before the signal got through. This has been compared to a water pipe. A certain amount of water must flow through the pipe before any appreciable amount is seen at the far end. It may require as much as 20 times more electricity to charge up an undersea cable than an aerial one.

Sir William Thomas (better known as Lord Kelvin) wrote his famous "Law of Squares" as the result of his investigations of this very matter. Simplified, his "law" means that if the length of a submerged cable is multiplied 10 times, the rate of signaling will be reduced 100 times. His solution was to increase the size of the conducting core. Nevertheless, because this new discovery was ignored, the poor design of the first Atlantic cable contributed to its subsequent failure.

Finally, though, on August 5, 1858, the first transatlantic submarine cable linked the continents between Ireland and Newfoundland. Eleven days later, a 99-word message of greeting from Britain's Queen Victoria to United States President Bu-

chanan started through the lines. It was completed 16½ hours later. Sadly, the cable burned out less than a month later. At today's costs, close to two million dollars of private capital lay sunk in the depths of the Atlantic! What had been called "the greatest achievement of the century" had collapsed. Eight years would pass before Europeans and Americans would speak over the wires again.

During the interim, the two cable manufacturers of England merged, thereby solving many of the earlier cable-making problems. A new and better-protected cable was designed. It was twice as heavy (7,000 tons [6,350 metric tons]) and had a conducting core three times as large as the previous cable. It could hang vertically in the water for 10 miles (16 kilometers) before snapping. And for the next attempt there was a single ship (instead of the two required before) capable of carrying such a tremendous burden. This vessel, the *Great Eastern*, had a dual propulsion system of two 58-foot (18-meter) paddle wheels, six masts, and a 24-foot (7-meter) screw. This made her the most maneuverable ocean liner ever built. By throwing one wheel into reverse, she could completely rotate around her own axis.

After two more unsuccessful attempts, a truly successful cable was completed on July 27, 1866. It connected Ireland with Newfoundland. But 700 miles (1,100 kilometers) away from the new cable lay one tangled up with lost grappling irons—a victim of the previous summer's failure. After 30 attempts, it was hauled up, tested and spliced with new cable. This completed the West-to-East portion. When the Newfoundland ends of the two cables were connected, a submarine circuit of more than 4,000 miles (6,400 kilometers) came into existence. Across this distance, clear signals were sent. A simple battery made out of a lady's silver thimble containing a few

drops of acid was all that was needed to charge the cable! Since that time, two-way communication has never ceased for more than a few hours at a time between the two continents.

From 1866 onward, cables spread swiftly across the oceans of the world. By the end of the century, 15 cables had been laid across the Atlantic. Some sections of these original cables are still in service, after more than a century of operation!

Wartime Targets

Many remote islands, such as the Cocos in the Indian Ocean, Ascension in the South Atlantic, and Guam and Midway in the Pacific, have become strategic crossroads of world communications because of these submerged cables. As a result, these islands were major military objectives in wartime. Cable stations, as well as the cables themselves, became prime targets. The only two cables owned by Germany in 1939 were cut less than 24 hours after World War II started. A British midget submarine in 1945 cut the Saigon-Singapore and Saigon-Hong Kong cables. This battle of the seabed lasted for the duration of the war.

Cable Enemies

The cable's inventor, man, has also proved to be the most common enemy of the cable, not only in times of war, but, more frequently, by the dragging of trawls and the use of ships' anchors. Also on the enemy list are corrosion, sharp-toothed fish, borers and natural phenomena.

A submarine earthquake occurred in Australia in 1888, simultaneously snapping three cables to that continent. Underwater avalanches, triggered by earthquakes, travel initially at about 50 miles (80 kilometers) an hour and easily snap cables. In

1929 an avalanche snapped most of the cables between Europe and America. They broke one after another in rapid succession. It took six months to repair the damage, with a loss to the cable companies of over \$1.5 million.

Cables and cable ships are owned and maintained by various nations. Ships ply all the oceans of the world to deal with these cable enemies. Recovering and repairing a damaged cable is no longer the difficult thing it once was. Now electrical measurements locate the break, the ship proceeds to the spot and puts down a marker buoy, and dragging begins.

The Telephone Goes Underwater

After the birth of the telephone in 1875, efforts were begun to achieve with this new instrument what had been done with the telegraph. Almost immediately, the problems that had plagued the underwater telegraph cables began reappearing for telephone engineers, but in a far more severe form. Again, the foremost difficulty was the old problem of signal retardation and distortion. Due to the great complexity of human speech, many years of intense study and intricate engineering were required before good-quality speech of today's standards would be achieved through submerged wires.

Meanwhile, in 1896, the radio came into being. On its heels, shortwave radio was introduced. This entirely new and unexpected method of long-distance communication provided the underseas cable with what has been called "its greatest challenge." By way of shortwave radio, the human voice spanned the Atlantic 40 years before the first successful transatlantic telephone cable was laid. From 1927 until 1956, this was the only means of sending

human speech across the oceans. Its success, however, was limited, as it depended almost entirely on good weather. Messages sometimes required days to get through. But great advancement was made in radio communication, and, in turn, much of this technical knowledge contributed to the success of the submarine telephone cable.

Transatlantic Telephone Cables

The first transatlantic telephone-cable system linked Newfoundland with Britain by way of Scotland and was laid in three installments. Every splicing joint was X-rayed to be sure that there was not the slightest defect. Some problems arose, primarily due to Hurricane Ione; but they were quickly overcome. The two-cable system was a tremendous success when completed in 1956. Fifty-one repeaters, approximately 40 miles (65 kilometers) apart, magnify human voice currents going eastward. About 25 miles (40 kilometers) away lay the other cable with an equal number of repeaters sending the currents westward. The laying of this cable started an explosion of cable-laying activity across the seas.

Later, due to the very ingenious electronic invention known as TASI (Time-Assignment Speech Interpolation) and solid-state transistors, it became possible to double the number of channels on the cables. This swift-acting device takes advantage of silences in common conversation and switches in other conversations. The 1956 cable had 36 circuits. But think of the potential with cables such as the one completed in 1976 that links the United States and France and that carries 4,000 channels! And with TASI it can be doubled!

The Pacific Voiceway

A telegraph cable had been laid between the United States and Hawaii as early as 1903. Its ends were pulled ashore at Waikiki Beach with the help of a small donkey engine. Hawaii's first telephone company was established only seven years after the invention of the telephone. But it was not until 1931 that Hawaii was tied in with long-distance telephone through short-wave radio. With the completion of the 2,400-mile (3,800-kilometer) cable from California to Hawaii in 1957, what became known as the Pacific Voiceway came into existence. This \$36,000,000 project augmented the 14 radio-telephone circuits existing at that time. It took just eight seconds to put through a three-way telephone call between Hawaii, Alaska and London, and it was as clear as a bell. The cable also carried 36 circuits. Interestingly, at the time, an official stated: "It is seldom that that many people will want to call the mainland at any one time. So some of them will not always be in use." How wrong he was!

Seven years later, the \$80,000,000 (U.S.), 5,300-mile (8,500-kilometer) Voiceway to the Orient came into being. For the first time, the United States was linked directly with the Orient by way of Hawaii. By this time a single cable capable of carrying speech both ways could be used. It has 128 circuits and, with TASI, can be boosted to carry 256 conversations simultaneously. This almost unbelievable project enlisted the efforts of experts in physics, engineering, chemistry, oceanography, fishing, skin diving and volcanology. Yes, the Pacific carries threats that the Atlantic had not presented—volcanoes, coral reefs, tidal waves and the world's deepest trenches. The Mariana Trench, the world's deepest known hole, plunges to over seven miles

(11 kilometers) between Guam and Midway and could not be avoided when laying the cable. Starting in San Luis Obispo, California, the cable connects with Japan by way of Hawaii, Midway, Wake and Guam. At present, it is possible to dial directly from Honolulu to most cities on the United States mainland and to many European countries. And, using a 14-digit number, it is possible to dial from New York to any private phone in Japan for a clear-as-a-bell instantaneous connection.

Modernization and Practicality

A whole series of scientific inventions has revolutionized cable laying. Special ships have been built for this purpose. There have been improvements, not only of the cable, but in transmitting and receiving equipment. The repeaters have been streamlined. Instead of the triode radio tubes, transistors are used. A single cable can now replace the two that were formerly needed. Today telephone and telegraph messages, television pictures and a vast amount of electronic data can be sent over them as well.

Instead of communications satellites dooming the underseas cable, as had been feared, these have been a stimulus to them. Because of the increase and efficiency of cables, there has been a virtual communications explosion.

Costs have been reduced drastically. In 1957, the lowest-priced night call from Hawaii to California was \$5.25 (U.S.) for three minutes. Now it has been lowered to 80 cents. Instead of taking 16½ hours to get through, messages take less than a tenth of a second to travel the same distance. So if you have a loved one less than a second away, why not use these speaking wires of the deep?



Have you seen a fulgurite?

DOUBTLESS you have heard of trees being split and people being killed by lightning. But have you heard of fulgurites being formed by lightning?

The term "fulgurite" comes from the Latin *fulgur*, meaning "lightning," and has been used since 1821 to describe the unusual mineral formation created when lightning strikes a sandy patch of ground. The intense heat of the electrical discharge melts some of the sand and forms a long, narrow and very fragile tube of glass.

Most fulgurites, or "lightning tubes," are only a few meters long. However, some have attained a length of as much as 20 meters (66 feet). They usually go straight down and, less frequently, run parallel to the surface of the ground.

The tendency for lightning to follow the path of least resistance accounts for the irregular shape of the tubes and the forks or small offshoots protruding from the main stem. The length of a fulgurite seems to be determined by the depth and resistance of the sand, the position of the local water table and the power of the discharge.

Since temperatures of 30,000 degrees Celsius (54,000 degrees Fahrenheit) can be reached in a lightning flash, quartz sand can be heated to the 1,700 degrees Celsius (3,100 degrees Fahrenheit) needed to melt it, and that for quite a depth into the earth's surface.

These tubes are generally only about one centimeter (0.4 inch) in diameter, but they may reach a diameter of several centime-

ters. The exterior is characterized by ridges and flanges with semifused and unfused sand grains adhering to them. A fulgurite is roughly circular in shape.

The hollow core is thought to be formed by the rapidly developed outward pressure from the expansion of gases emitted by the instantaneous heating of the damp sand. In most cases, the silica glass wall, smooth on the inside, is only about 1 millimeter (0.04 inch) in thickness. It is generally light gray in color, although some opaque-white to dark-gray ones have been found.

Fulgurites are mainly found in sandhill country that is prone to electrical storms. On occasion, the exact position of the lightning strike has been observed and a fulgurite has been located when the ground around it is still warm. At other times, fulgurite hunters have been rewarded with finds where the surface of the sandy ground has been eroded away, revealing the upper section of the tube.

As you can imagine, it is extremely difficult to extract such a thin glass tube intact, considering its length and frailty. Usually the tube breaks into many pieces, which have to be painstakingly pieced together. Hence, a relatively small number of fulgurites have been preserved.

Although rare, fulgurites have been found all over the world. So, perhaps, when visiting a nearby museum, you may be able to view a fulgurite and see for yourself what can happen when millions of volts of lightning strike the earth.

The Bible's View



Who Is

"the Alpha and the Omega"?

IN THE most ancient Greek manuscripts of the book of Revelation, the expression "the Alpha and the Omega" appears three times. Does this designation, as many believe, apply both to the Almighty God, Jehovah, and to his Son Jesus Christ? Just what is the significance of the title "the Alpha and the Omega"?

The word "alpha" is the name for the first letter of the Greek alphabet, whereas the term "omega" designates the last letter of the Greek alphabet. Hence, in itself, the title "the Alpha and the Omega" conveys the idea of the start and the finish or completion of a thing. The personage who is so designated would, therefore, be viewed as the beginner of certain things and the one who brings these things to a successful conclusion.

Based on what is revealed in the Hebrew Scriptures, the title "the Alpha and the Omega" would certainly fit Jehovah God. At Isaiah 55:10, 11, for example, we are told: "Just as the pouring rain descends, and the snow, from the heavens and does not return to that place, unless it actually saturates the earth and makes it produce and sprout, and seed is actually given to the sower and bread to the eater, so my word that goes forth from my

mouth will prove to be. It will not return to me without results, but it will certainly do that in which I have delighted, and it will have certain success in that for which I have sent it."

How forcefully this emphasizes that whatever Jehovah God expresses will be brought to a successful finish! Water falling in the form of rain or snow eventually filters down into the soil, there to combine with nutrients. In this way the precipitation furnishes what is needed for plant growth. In the case of grain, some of the seed may be set aside for sowing in the next season, and a far larger portion may be ground into flour for making bread. Thus the ultimate purpose of the precipitation is realized—seed is given to the sower and bread to the eater. Likewise, whatever Jehovah God, as the Beginner, sets in motion by his word always is brought to a successful end.

But does the title "the Alpha and the Omega" apply exclusively to Jehovah God? To answer this question, we must examine the context in which this designation appears.

Revelation 1:8 states: "The Lord God says, 'I am the Alpha and the Omega, the One who is and who was and who is to come, the Almighty!'" (*The New American Bible*) Clearly, the reference here is to the Most High God Jehovah.

While Jesus Christ is referred to in the previous verse as "coming with the clouds," the words of Revelation 1:8 and the surrounding verses show that he could not be "the Alpha and the Omega." In the Scriptures, only the Father of the Lord Jesus Christ is spoken of as "the Lord God" and as the "Almighty." Jesus Christ even refers to his Father as "my God." (John 20:17; Rev. 3:12) According to Revelation 1:1, the revelation was given to Jesus Christ by God. Hence, we should expect the words of the Almighty God to be quoted in the account. The first reference to "the Alpha and the Omega" is manifestly an

example of this. Moreover, in the very next verse, the writer of the book of Revelation, the apostle John, says: "I . . . came to be in the isle that is called Patmos for speaking about God and bearing witness to Jesus." (Rev. 1:9) This provides additional confirmation that John understood God to be the Father of the Lord Jesus Christ.

In what sense is Jehovah God "the One who is and who was and who is to come"? Being the eternal God, Jehovah has at all times been the Almighty. (Ps. 90:2) So, in the indefinite past, he was the Most High. Furthermore, he continues to be the Almighty God and will come in that capacity to execute his judgment. As shown in other parts of the book of Revelation, Jehovah God will display his all-powerfulness at the time that his Son destroys all opposers of his sovereignty. —Rev. 16:14; 19:13-16.

The next occurrence of the title "the Alpha and the Omega" is found at Revelation 21:6. In the following verse, the One who applies this title to himself says: "Anyone conquering will inherit these things, and I shall be his God and he will be my son." Since Jesus Christ speaks of himself as a "brother" of these conquerors, it is the Father of the Lord Jesus Christ who is referring to himself as "the Alpha and the Omega."—Compare Matthew 25:40; Hebrews 2:10-12.

Finally, at Revelation 22:12, 13, we read: "Look! I am coming quickly, and the reward I give is with me, to render to each one as his work is. I am the Alpha and the Omega, the first and the last, the beginning and the end." This quotation appears among others that are ascribed to an angel and to Jesus Christ. Before these words are quoted in the book of Revelation, the angel who was instrumental in presenting the revelation to the apostle John spoke. (Rev. 22:8, 9) Then, after the quotation that begins with Revelation 22:12 and ends with the words of verse 15,

we find the statement: "I, Jesus, sent my angel." (Rev. 22:16) Since the context does not necessitate our attributing the words of Revelation 22:12, 13 either to the angel or to Jesus, they could have originated with another speaker. Consistent with the rest of the book of Revelation, "the Alpha and the Omega" must be the Almighty God. He is the One who comes in the capacity of a judge to reward and to punish individuals according to their works.

The thought expressed at Revelation 22:12 also harmonizes with what the apostle Paul wrote. He stated: "According to your hardness and unrepentant heart you are storing up wrath for yourself on the day of wrath and of the revealing of God's righteous judgment. And he will render to each one according to his works; everlasting life to those who are seeking glory and honor and incorruptibleness by endurance in work that is good; however, for those who are contentious and who disobey the truth but obey unrighteousness there will be wrath and anger, tribulation and distress, upon the soul of every man who works what is injurious, of the Jew first and also of the Greek; but glory and honor and peace for everyone who works what is good, for the Jew first and also for the Greek." (Rom. 2:5-10) Of course, the judgment will be expressed by Jehovah God through his Son, for the apostle also says: "This will be in the day when God through Christ Jesus judges the secret things of mankind."—Rom. 2:16.

The fact that Jehovah God speaks of himself as "the Alpha and the Omega" gives us the assurance that what he has purposed will come to a successful realization. This should prompt us to do our utmost to be found approved by him. Our reward will then be certain, for the Bible tells us: "God is not unrighteous so as to forget your work and the love you showed for his name."—Heb. 6:10.



Watching the World

New Arms Spending Peak

◆ Spending for military equipment and personnel throughout the world has now passed the \$400-billion mark annually. It is estimated that at the current rate of increase, the cost would reach \$1 trillion by the end of the century. About half the current expenditure is accounted for by the United States and the Soviet Union. However, even the less-developed nations now spend more for arms than for any other single program.

Orient's Tallest Building

◆ The tallest building in the Orient was opened earlier this year in Ikebukuro, outside downtown Tokyo. The office building is 60 stories high (240 meters, or 787 feet). The building has 37 elevators, two of which go directly to the observatory and are rated as the fastest in the world, traveling 600 meters (1,969 feet) a minute and taking less than 30 seconds to reach the top. Officials say that this is the tallest building that can be built in earthquake-prone Japan with present technology. It is designed to withstand a quake three times as strong as the one in 1923 that killed an estimated 90,000 people in that area.

Electricity from Garbage

◆ The German city of Munich derives about 12 percent of

its electricity by burning its own wastes, producing steam to turn electric generators. In Paris, several plants use about 1.7 million tons of garbage annually to generate electricity and also to heat buildings, saving an estimated 480,000 barrels of oil each year. The largest waste-burning plant in the world, near Rotterdam, uses 3,200 tons of refuse each day. It produces 55 million watts of electricity, and also desalinates water from the Rhine River. Of the reported 262 plants in the world that use waste material as fuel to generate electricity or heat, three quarters are in western Europe and most of the rest are in Japan.

More Bombings

◆ The Treasury Department reports a record 1,058 bombings in the United States during 1977, up from 870 the year before. Thirty-eight people were killed. Labor strife was thought to be a major cause, as was vandalism.

Change in Homicide Pattern

◆ Years ago, about 10 percent of the homicides in the United States involved strangers. The rest were committed against persons known by the killer, such as family members and other relatives, friends, neighbors or work associates. Now, murders involving strangers are up to 30 percent nationally.

This indicates a more widespread level of violence, since many of these murders accompany robbery, burglary, assault or larceny-theft. Homicide is now the fifth leading cause of death for nonwhite males, the eighth for nonwhite females, and the 12th for white Americans.

Human Power

◆ The average American automobile can produce 200 horsepower for as long as its fuel lasts. The average athlete produces about half a horsepower, and only for a short period. When human power is coupled with a vehicle such as a bicycle, how fast can it go? In timed races on a 200-meter (656-foot) course, the record for a human pedaling a bicycle-like vehicle is about 50 miles (80 kilometers) an hour.

A Losing Game

◆ The first gambling casino in the eastern United States opened in Atlantic City, New Jersey, earlier this year. For the first six days of operation, the casino's "win" averaged \$438,504 (U.S.) a day. The average player lost at the rate of \$18 an hour, with slot-machine players losing the most, an average of \$18.64 an hour.

Can Be Equal Risk

◆ Smokers may be deceiving themselves if they think that they are less liable to get smoking-related diseases such as cancer by switching to low tar and nicotine cigarettes. Research reveals that most persons who smoke low tar and nicotine cigarettes hold the smoke longer in their lungs, unaware that the longer period makes them about as susceptible to harm as smoking higher tar and nicotine cigarettes but inhaling the smoke for a shorter period.

Marijuana Greater Hazard

◆ As more information becomes available, the high hazards of smoking marijuana

become more apparent. Dr. Donald Tashkin of the University of California School of Medicine at Los Angeles conducted tests lasting five years, using paid volunteers. His experiments showed that chronic, heavy marijuana smokers run a higher risk of suffering chronic bronchitis and emphysema than do chronic heavy tobacco smokers.

Riding on Lap Dangerous

◆ A safety research group concludes that a passenger's lap is the most dangerous place for a child to be while riding in an automobile. In frontal crashes, the child and the adult continue to move forward as the vehicle comes to an abrupt halt, causing the child to be crushed between the person holding him and the interior surfaces such as window frames, instrument panels, doors and even floors. In one case, a 14-month-old child riding on a passenger's lap in the rear seat was found face down with the adult on top of him. The child died of brain injuries, and also had sustained multiple fractures and cuts from being crushed between the adult and the back part of the front seat. But in the same accident, a nine-year-old passenger, sitting beside the adult and wearing a lap belt, received no injuries.

"Little Strokes"

◆ A stroke takes place when the blood supply to the brain is reduced due to a blood clot or bleeding from an artery. When nerve cells in the brain are deprived of blood, the part of the body controlled by these nerves will not function normally. An often unsuspected cause of impaired physical and mental health is a series of "little strokes." Such strokes can start when a person is 30 or 40 years of age, and may happen at night or pass almost unnoticed as a dizzy spell, a temporary blackout, or just a few moments of confusion. While they are not severe

enough to compel the victim to seek medical aid, some brain damage can remain. Medical science is seeking to learn more about the causes, symptoms and treatment of these "little strokes."

Vertical Childbirth

◆ A report at the annual meeting of the American College of Obstetricians and Gynecologists offered strong evidence that keeping women in a more vertical position during labor and birth is generally superior to an in-bed horizontal position. It was observed that in 1783 a French doctor first proposed a horizontal position in bed for childbirth, not because it would benefit the mother or infant, but because it was easier for the doctor. But in controlled studies of pregnant women, it was found that babies are born faster, easier, and with less pain and fewer complications when mothers are in a more vertical position during labor and delivery. The seven-nation study concluded that the older way, vertical delivery, is best for the majority of normal births. Forceps had to be used only 0.7 percent of the time in vertical births compared to 6.7 percent of the time in horizontal births. And among women having their first babies, the vertical women's labor was 36 percent shorter. Vertical birth is very ancient. About 3,500 years ago, Israelite women were spoken of as using "the stool for childbirth." (Ex. 1:16) But any who use such a method today would be wise to do so only under skilled supervision.

Caution on Cooling Dip

◆ After a long period of sunbathing on a beach, a sudden, cool dip in the sea might be fatal, says Dr. David Ryde, medical officer of England's Crystal Palace National Recreation Center. He states: "If you are lying on the beach sunning yourself the blood vessels in the skin dilate. Dur-

ing this time the skin contains about an extra litre [quart] of blood. Sudden cold causes the vessels to send this blood back into the system again. It is like having a sudden transfusion, and sometime the heart cannot cope." At other times, the sudden shock can cause fainting, and the unconscious person drowns.

Body Worth More

◆ Some years ago, it was estimated that the basic raw materials in an adult body, such as calcium, magnesium, iron and other chemicals, were worth 98 cents. According to Dr. Harry Monsen of the Illinois College of Medicine, they are now worth \$5.60 due to inflation. Monsen said: "When people were told they were worth only 98 cents they were shocked. They feel better knowing they are worth \$5.60."

CB Antennas Can Kill

◆ At least 123 persons were electrocuted in the United States by communications antennas in one year, half of them involving citizen band radio antennas that touched power lines. In a recent one-month period, at least eight men died from CB antenna electrocution. The number being killed this way may be higher, says the U.S. Consumer Product Safety Commission, since not all death certificates specify the direct cause of an electrocution.

No Laughing Matter

◆ Nitrous oxide, or "laughing gas," is an anesthetic given to dental patients to relax them while the dentist performs his work. But some dentists habitually inhale the gas for its intoxicating and relaxing effects, and have become addicted. As a consequence, some have suffered symptoms similar to those of multiple sclerosis, a degenerative disease of the central nervous system. Included in these symptoms are a loss of bladder control and difficulty in walking.

Who Is More Generous?

◆ A Harvard University study showed that members of the lower socio-economic classes tend to be more charitable and more inclined to share with others when able than the more affluent classes. Poor children were less selfish than children from wealthier classes. Also, Northwestern University studies indicate that generosity is contagious, that when we observe others being generous, we tend to imitate that behavior. And experiments at the University of Washington reveal that when persons engaging in various activities were approached for help, those who were eating were the most generous.

Most Preferred Television

◆ A newspaper, the *Detroit Free Press*, asked 120 families

if they would turn off their television sets completely for one month if offered \$500. More than three quarters of the families (93) said No. Of those who said Yes, five were selected actually to do it. After the month without television, most fathers said that they had become better acquainted with their children, and four of the families said that they had become closer. Some of the children played peacefully without television interference, but other children begged for the TV.

Unemployed Youth

◆ Of the estimated six million unemployed in western Europe, at least a third are under the age of 25. Many of these young persons face the prospect of staying unemployed for much of their lives. When

the millions of other unemployed in Asia, Africa and South America are added, it can be seen why many world leaders are deeply concerned about the future.

Preventing Wrinkles

◆ A clinical professor of dermatology in San Antonio claims that all the creams, hormone masks, face exercises and steam treatments that women use are almost useless in preventing wrinkles. Dr. B. L. Limmer says that while cosmetics can hide blemishes and lines, and accentuate beauty, they can do nothing to overcome wrinkling and aging. He claims that cleansing the face with a mild soap and water twice a day, and using a pure oil or moisturizer such as baby oil, is enough for any type of skin.

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If they would turn off their television sets completely for one month it would cost \$500. More than three quarters of the families (75) said No. Of those who said Yes, five were selected actually to do it. After one month without television, most fathers said that they had become better acquainted with their children and their families said that they had become closer. Some of the children played peacefully without television interference, but other children begged for the TV.

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