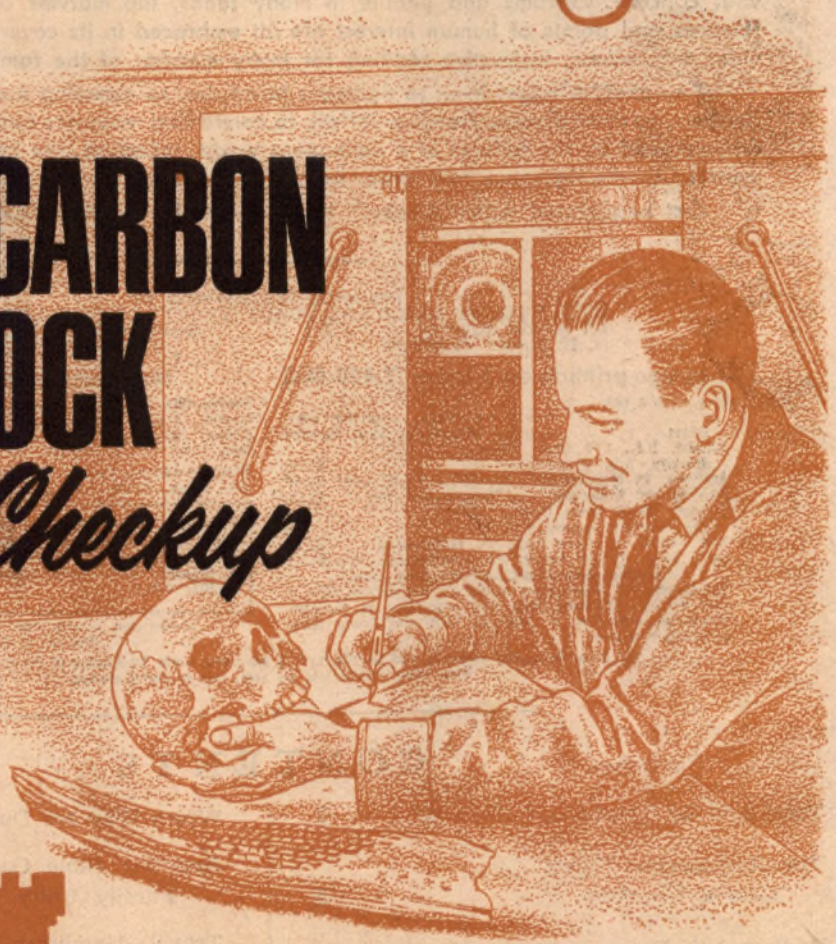
Awake!

THE RADIOCARBON CLOCK *Gets a Checkup*



APRIL 8, 1972

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Awake!

"It is already the hour for you to awake."
—Romans 13:11

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TRUST and be trusted

NOT least among the blessings of life are friends that one can trust and that trust one another. There was a time when persons were readily inclined to trust others; honesty was more or less taken for granted. But no more. At least not in the larger cities. As violence and wickedness increase, and every imaginable form of immorality and all kinds of dishonesty become more commonplace, people become more and more suspicious, less and less trustful.

Thus *Life* magazine, November 19, 1971, featured a cover article entitled "The cities lock up. Fear of crime creates a life-style behind steel." It told of an apartment house in which 17 out of 24 of the tenants had been burglarized at least once, and one of them three times. The article showed the picture of the front door of a home defended by five locks, two peepholes, alarms, chains, bars, bolts and booby traps. And all this in one of the better residential sections of New York city. Distrustful? Suspicious of strangers? No question about it!

And not only are houses burglarized. People are held up at gun or knife point in broad daylight. Hardly a week goes by that one does not hear of a friend or relative who has been robbed. People are advised not to venture forth alone, especially not at night, for usually it has been those who were alone that were beaten or robbed.

In view of the worsening crime situation, caution is the prudent course. But if we do not exercise care, this caution, this distrust of strangers, can influence all our relationships with others. If we let that happen, what would result? Would we not cause even those who might have been friends to become distrustful, suspicious of us in return? That is why there is talk of every man being an island and of persons being lonely though in a crowd.

We cannot help influencing others. It is even as Jesus of Nazareth, the Son of God, enunciated: "Stop judging, and you will by no means be judged; and stop condemning, and you will by no means be condemned. . . . For with the measure that you are measuring out, they will measure out to you in return."—Luke 6:37, 38.

If we are unduly distrustful or suspicious of another we could well discourage him or perhaps harm him in other ways. History records many crimes that were

committed because of a lack of trust, because of suspicion. Those who stabbed Julius Caesar to death included some of the very men whom he considered to be his friends. Why did they do it? Because of being suspicious of his ambitions. King Herod murdered members of his own family because of suspicions.

Among the relationships where there should be a high degree of trust is the family circle. We all are imperfect; we all make mistakes. Even if we have the best intentions we are not always consistent, and so at times we may well disappoint a loved one. This being so, what a blessing it is when those close to us show that they understand our weaknesses, and so are not quick to impugn our motives or judgment but to give us the benefit of the doubt. We need to remember that even when circumstances may appear to be suspicious, as Shakespeare showed in his tragedy "Othello," yet the person can truly be innocent.*

We make both ourselves and the other person unhappy if we are suspicious, distrustful. Why not give him the benefit of the doubt, appreciating that there could have been extenuating circumstances? Especially when we are inconvenienced or tried in some way by the other person's shortcoming do we need to exercise care so that we do not let impatience make us harsh and critical. By showing loving and trustful concern and exercising empathy —saying, "It could have happened to me" —not only will we make matters more pleasant at the time, but we are bound to reap personal dividends. When "time and unforeseen occurrence" make us the cause of trial to another, then we can hope to be shown the same trustful empathy. Here too the Bible principle applies, 'What you sow you will also reap.'—Eccl. 9:11; Gal. 6:7.

The same principle applies to the parent-child relationship. There is no question today about the reality of the "generation gap." Youths proclaim their rebellion by the clothes they wear, by the way they groom their hair, by the language they use, by their resorting to drugs and in many other ways. Parents complain, and rightly so, that their children do not confide in them, that they show a lack of trust in them. But what most likely is the cause? Could it not well be that the parents in the first place have not been sufficiently intimate, confiding, honest and trusting with their children?

But not all parents have cause for complaint. There are parents who have shown themselves understanding, unselfish, deeply concerned with the mental, emotional, spiritual and physical growth of their children. Such parents have been as an open book to their children, so that their children naturally trusted them; they are parents who have put the welfare of their children ahead of their own conveniences and pleasures. As a result, their children are not strangers to them.

The same principle also applies among members of a Christian congregation. He who would be trusted must show himself trusting. Make allowances for the shortcomings of others; give them the benefit of the doubt. Remember that it is the privilege of the strong to bear the burdens of those not strong, to be patient, long-suffering, hoping for the best. Better to suffer disappointment and even loss from being overly trustful of a Christian brother than to discourage or stumble another because of being distrustful. Your trusting attitude will cause others to trust you. Trust is a two-way street. Trust and be trusted.—Rom. 15:1.

* In this tragedy the husband kills his wife in a jealous rage, only to find out that she was innocent, and so he commits suicide.

The RADIOCARBON CLOCK Gets a Checkup

AMONG the scientific tools devised to help to satisfy man's curiosity about his past, none is better known than the radiocarbon clock. This method of dating organic material in ancient artifacts is based on measurement of the radioactive carbon that is formed by cosmic rays in the atmosphere and taken up by plant life. It is most useful for dating things made of wood, charcoal and plant or animal fibers. Its workable range goes back more than 10,000 years.

Archaeologists are keenly interested in the results of such dating, because they study ancient men and their works. Bible students too have been interested in radiocarbon dating, because its range overlaps the 6,000-year history of man recorded in the Bible.

Perhaps you know that the radiocarbon clock was used to date the linen wrapping of the ancient manuscript of Isaiah discovered near the Dead Sea.[1*] The wrapping was found to be eighteen or twenty centuries old, thus confirming other proofs that the manuscript is genuine, not a clever recent forgery.

Symposium at Uppsala

Interest in radiocarbon dating has been stirred up anew by the recent publication (in 1971) of the proceedings of the Twelfth Nobel Symposium, held in Uppsala, Sweden, in 1969. There the radiochemistry experts from many countries met together with geologists and archaeologists. They discussed their latest researches into the theory and the practical use of radiocarbon (carbon 14) for dating. The honorary president was Nobel Prize winner W. F. Libby, of the University of California at Los Angeles, who pioneered carbon-14 dating in 1949.

The report of the conference conveys an overall feeling of satisfaction with current successes of the method. Conflicting results, which sometimes came out of different laboratories, have largely been reconciled. An accuracy of within fifty to one hundred years in the date is now expected. It is true that divergences larger than this have been found between the "radiocarbon age," as calculated from the radioactivity, and the real age of known samples, but this may be taken into account with a calibration curve measured in several laboratories.

This curve is based chiefly on wood taken from long-lived trees that have been dated by counting their annual rings. For example, a piece of wood 7,000 years old according to the ring count may give a radiocarbon age of only 6,000 years. So the 1,000 years is applied as a correction to be added to the radiocarbon age of any sample from that era.

The theory on which the radiocarbon method rests has been found to be much more complex than was expected twenty years

* References are found on page 20.

ago, and many of the corrections to the theory have been studied to see how they would affect the measured ages. By taking all this into account, it would appear possible to get a fairly exact age of organic material that was formed at any time in the past 7,400 years.

Now there are some samples taken from ancient men's houses and hearths that, according to the radiocarbon dates, are more than 6,000 years old. Such findings conflict with the Bible chronology, according to which the first man was created only 6,000 years ago. This raises some possibly disturbing questions. Has the increased refinement and apparent success of the radiocarbon clock made the Bible chronology obsolete? Can we still put our faith in the Biblical count of years, or has science shown it to be unreliable?

Before we jump to any conclusion, it would be prudent to look a little more closely into some of the details that were discussed at the Uppsala conference. When we do, we begin to wonder whether the detailed corrections in the theory of radiocarbon dates, which at first appear to make it more exact, do not actually open up more possible ways in which it can be wrong.

Necessary Assumptions

The relatively simple theory as it was seen twenty years ago was based on the following assumptions:

(1) That carbon 14, the radioactive component of natural carbon, decays with a half-life of 5,568 years.

(2) That the ratio of carbon-14 atoms to the stable carbon-12 atoms in "live" carbon has always been the same as it is today. This depends on two other assumptions (2a and 2b).

(2a) That the number of carbon-14 atoms has been constant; this means that the cosmic rays that form them must not have varied in the past 15,000 or 20,000 years.

(2b) Also, that the total amount of stable carbon in the "exchange reservoir" has been constant during the same time. This includes the carbon dioxide in the air, as well as the organic carbon in living things, because they are continually taking up carbon dioxide by photosynthesis and releasing it by respiration. Also, carbon dioxide dissolves in seawater, where it forms carbonic acid and carbonate, which becomes mixed with the dissolved carbonate in the ocean. This process also is reversible, although it may take fifty years. Mineral carbonate in the rocks is, of course, not considered to be part of the exchange reservoir.

(2c) Related to number two is the assumption that the production of carbon 14 has continued steady all this time, and this implies that its decay, on a worldwide basis, is in balance with its production.

(3) That any living thing, plant or animal, incorporates radiocarbon in its tissues while it is alive; then, after its death, the activity decreases mathematically according to the natural radioactive decay; it does not pick up radiocarbon through contact with younger materials, nor lose it by exchanging atoms with older carbon.

(4) That for practical use of radiocarbon dates, the sample must be contemporaneous with the event that it marks, and not something that grew a long time before.

Now let us keep in mind that, if the radiocarbon clock is to give correct dates, *all* of the above assumptions must be true. If even one of them is untrue, the method breaks down and will not give the correct age.

The first samples of wood from old trees and from the tombs of Egyptian kings, measured in Libby's laboratory, showed a reasonably good correspondence with the accepted ages of these samples, back to about 4,000 years. So it was thought that perhaps the assumptions were correct, at least nearly so. But how does the picture look now, after twenty years of investigation into the machinery of the radiocarbon clock? Do the assumptions still look as well-founded as they did then?

Reading through the reports of the Uppsala conference, one comes to the conclusion that, in fact, not one of the assumptions listed above is now known to be correct! Some of them are perhaps just a little wrong, but others have turned out to be quite wrong. Let us look at each of them again, in the light of present knowledge—or, it may be, of continuing ignorance.

Validity of Sample

Among the more obvious possibilities of error in radiocarbon dating is the loss in integrity of the sample. (Assumption 3) If a sample is altered by contact with, or contaminated by inclusion of, material that contains older or younger radiocarbon, the analysis cannot give the right answer. But the practical archaeologist has learned what to do about it when a sample comes back from the laboratory with a date different from what he expected. As Dr. Evzen Neustupný, of the Archaeological Institute of the Czech Academy of Sciences, told the symposium: "Contamination of samples by either modern or ancient carbon can often be clearly discerned if the result of a measurement deviates considerably from the expected value."[2]

To paraphrase his words, he does not recognize the contamination of the sample before he sends it in, but when he looks at it again, with the unpalatable answer attached, he can see clearly that it was contaminated.

The same expert also pointed out, relative to the importance of selecting contemporaneous samples (Assumption 4): "It should be clear, although many archaeologists seem to ignore it, that radiocarbon measurements date the age of the organic tissue of the sample, i.e., the time when it originated. The tissue of a sample dating some historical (or prehistoric) event might have been biologically dead for several decades or even centuries when it was used by ancient man. This applies to wood for building, charcoal from hearths, and most other kinds of materials."[2]

This is a point that the reader would do well to keep in mind when he sees a news item that radiocarbon dating of a piece of charcoal dug up from a cave somewhere proves that the cavemen lived there so-and-so many thousand years ago. There are places today where a camper could pick up firewood that had grown hundreds, even thousands, of years ago.

Errors of these kinds have occurred often enough to hinder the general acceptance of radiocarbon dates by archaeologists. But they have to do only with the application of the method to particular samples, so that one sample might be dated wrongly, but another correctly.

Beyond these, harder questions are being put to the radiocarbon-dating people, questions that strike at the very core of the theory itself. These questions, if not answered satisfactorily, raise doubts as to whether it can give the correct age of *any* sample.

Half-Life of Radiocarbon

One of the questions concerns the very first assumption. How sure is it that the half-life of carbon 14 is correct? Note the following comment by two experts from

the radiocarbon laboratory of the University of Pennsylvania:

"What causes the most worry about the veracity of these half-life determinations is the fact that they all depend upon the same basic methods—namely, the absolute calibration of a gas counter for determination of the specific disintegration rate, and the subsequent mass spectrographic measurement of the exact quantity of C-14 that was counted. In the first phase there is the difficulty of obtaining an absolute calibration of a gas counter, and in the latter there is the problem of precise dilution and introduction of the 'hot' C-14 into the mass spectrograph. An error caused by adsorption of C-14 on the walls of the containers may be prevalent and of roughly the same magnitude in all of the half-life determinations. Clearly, there is need for an entirely independent approach and technique before one can say with certainty what is the true value of the half-life of C-14."[3]

Libby himself was aware of this limitation in the accuracy of half-life. In 1952, writing of the vital importance of measuring absolute disintegration rates, he said: "It is to be hoped that further measurements of the half-life of radiocarbon will be made, preferably by entirely different techniques."[4] As yet this hope has not been realized.

Production of Carbon 14

What about the constancy of cosmic rays? (Assumption 2a) Observations have shown that they are not at all constant. Several factors are now known that cause large fluctuations in the cosmic rays.

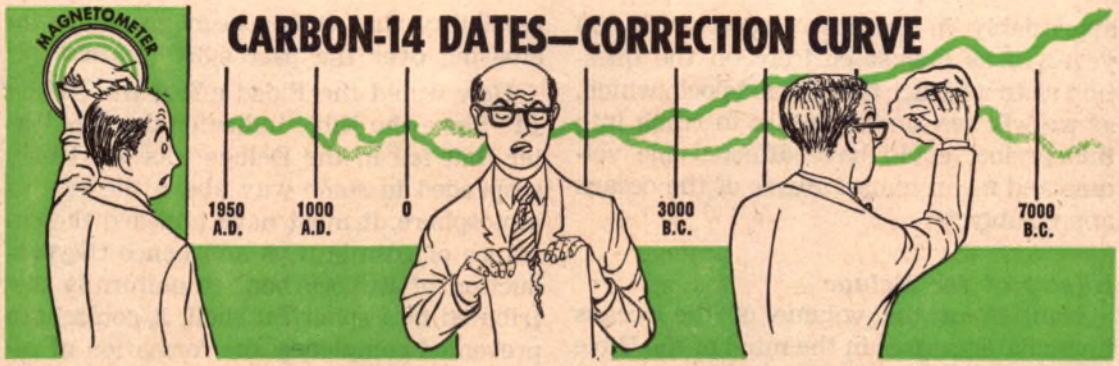
One of these is the strength of the earth's magnetic field. This affects the cosmic rays, which are mostly protons (charged nuclei of hydrogen atoms), by deflecting the less energetic particles away from the atmosphere. When the earth's magnetic field becomes stronger, fewer cosmic rays reach the earth and less radiocarbon is produced. When the earth's magnetic field becomes weaker, more cosmic rays reach the earth and more radiocarbon is produced.

Studies indicate that the magnetic field doubled in strength from about 5,500 years ago to about 1,000 years ago, and is now decreasing again. This effect alone can account for the needed correction of almost 1,000 years in the older dates.

Solar phenomena also cause large changes. The sun's magnetic field extends far out into space, even beyond the earth's orbit. Its strength changes, although not very regularly, along with the sunspot cycle of about eleven years, and this also affects the number of cosmic rays reaching the earth.

Then there are the solar flares. These great streams of incandescent gas burst out of the sun's surface sporadically and eject enormous numbers of protons. Those that reach the earth produce carbon 14. This makes for an unpredictable surplus in the supply. A table and a graph in the report show the production of carbon 14 from typical flares. On February 23, 1956, there was a flare that produced as much carbon 14 in a few hours as in a whole year of average cosmic radiation. It is obviously impossible to include this kind of effect in the corrections to the radiocarbon clock, for no one knows whether the flares in past millenniums were more or less active than they are now.

The intensity of cosmic rays entering the solar system from the galaxy is another little-known factor. Geochemical scientists have tried, by measuring the very faint radioactivities of various elements produced in meteorites by cosmic rays, to get some idea of average intensities in the past. However, the results do not help much in giving the desired assur-



The carbon-14 dating method has been "corrected" so much that it is difficult even for other scientists to understand. Do the "corrections" open up more ways in which it could be wrong?

ance of constancy over the past 10,000 years.

The radiocarbon theory would be in a stronger position (though still not invulnerable) with respect to the above objections if it could be shown that the radiocarbon is today decaying as fast as it is being formed. (Assumption 2c) If this is found not to be true, then the assumption of a constant inventory of carbon 14 is also proved untrue, and the assumed constant activity of radiocarbon is put on a precarious tightrope between two mooring posts that may be rising independently of each other.

The production rate is very difficult to calculate. Libby attempted to do this with the best data available up to 1952. He found a production corresponding to about nineteen atoms of radiocarbon per second for every gram of carbon in the reservoir. This was somewhat higher than his measurement of sixteen disintegrations per second. But in view of the complexity of the problem and the rough estimate that had to be made of so many factors, he regarded this as agreeing well enough with his assumptions.

Seventeen years later, with better data and better understanding of the process, can this be calculated more precisely? The experts at the symposium could say nothing more definite than that the radiocarbon is being produced at a rate probably between 75 percent and 161 percent of the rate at which it is decaying. The lower figure would mean that the amount of radiocarbon is presently decreasing; the higher figure, that it is increasing. The measurement gives no assurance that it is constant, as the radiocarbon theory demands. Again, recourse is taken to the view that "the relative constancy of the C-14 activity in the past suggests that [this ratio] must be confined to a much narrower range of values."[5] So one assumption is used to justify another.

Reservoir of Carbon 12

Not only the inventory of carbon 14, but also the stable carbon 12 in the exchange reservoir, must be constant to keep the radiocarbon clock synchronized. (Assumption 2b) Have we good reason to believe that this assumption is valid?

Since there is about sixty times as much carbon in the ocean as in the atmosphere, we are concerned chiefly about that oceanic reservoir. This point came up for discussion at the Uppsala meeting, where the consensus was that what they call an "Ice Age" could cause major perturbations. Libby had pointed out this possibility in 1952:

"The possibility that the amount of carbon in the exchange reservoir has altered

appreciably in the last 10,000 or 20,000 years turns almost entirely on the question as to whether the glacial epoch, which, as we will see later, appears to reach into this period, could have affected the volume and mean temperatures of the oceans appreciably."[6]

Effects of the Deluge

Mention of the volume of the oceans immediately raises in the mind of the Bible student the possibility of major dislocations in the radiocarbon clock at the time of the global deluge of Noah's day, 4,340 years ago. The oceans must certainly have been much greater in extent and depth after the Flood. This in itself would not increase the amount of carbonate in the ocean; it would merely dilute it. The amounts of carbon 14 and carbon 12, as well as their ratio, which determines the specific activity, would not have been changed merely by the fall of the water. However, the increased volume would give the ocean the capacity ultimately to carry a much larger load of dissolved carbonate.

And adjustments in the crust of the earth would be expected because of the greatly increased weight of water on the ocean basins. This pressure would be greater than that over the continents. It would push the underlying plastic mantle away from the ocean beds toward the continents, thus lifting them to new heights. This would expose rock surfaces to increased erosion, including the limestones in the beds of shallow seas that geologists show in low-lying continental areas in their maps of Pliocene times.

So, beginning shortly after the Flood, the oceanic reservoir of carbonate would steadily increase until it reached the concentration we have today. Then, rather than assume that the carbonate reservoir has been constant, we should consider the possibility that it has been gradually increasing over the past 4,300 years.

How would the Flood affect the carbon 14? Since the Bible indicates that the water that fell in the Deluge was previously suspended in some way above the earth's atmosphere, it must have impeded the entrance of cosmic rays and hence the production of radiocarbon. If uniformly distributed in a spherical shell, it could have prevented completely the formation of radiocarbon. However, it is not necessary to assume this; the water canopy might have been thicker over the equatorial parts than over the poles, thus admitting cosmic rays at low intensities. In any case, the removal of this shield by its falling to the surface would increase the rate of producing carbon 14.

Thus, we should expect that, after the Flood, both the radioactive carbon 14 and the stable carbon 12 in the oceanic reservoir would begin to increase rapidly. Remember that it is the ratio of carbon 14 to carbon 12 that fixes the specific activity. So, depending on just how quickly the erosion of the land added carbonate to the seas, the activity might either increase or decrease. Indeed, it would be possible, though not probable, that the growth of one would just balance the growth of the other; in that case, the radiocarbon clock would have continued to run uniformly right through the Flood. Libby pointed out the possibility that such a fortuitous balancing could bring about the "agreement between the predicted and observed radiocarbon contents of organic materials of historically known age."[7] But he did not prefer this explanation.

Since the inventories of carbon 14 and carbon 12 are independent of each other, it is possible to postulate values that would account for the excessive ages reported on old samples. For example, if we assume that the specific activity before the Flood

was about half its present value, all pre-Flood specimens would appear to be about 6,000 years older than they really are. This would also be true for a while afterward, but with a rapid erosion of carbonate in the centuries after the Flood, the error would be reduced. It appears that by about 1500 B.C.E. the activity had approached its present value, since radiocarbon ages seem to be nearly right since then.

The Simultaneity Principle

These are some of the recognized problems that beset the radiocarbon chronology. There are others that have hardly been considered, and possibly some yet unthought of. These are the reasons why the theory set forth twenty years ago is no longer tenable. It is just not possible, merely by measuring the radiocarbon in a sample and comparing it with the present-day activity, to tell with any assurance the age of the sample. However, one feature of the radiocarbon theory seems to have held up so far, the principle of simultaneity.

This principle states that at any time in the past, the radiocarbon level was the same all over the world, so that all samples that originated at the same time had the same activity. So, barring alteration and contamination, they will have decayed to the same measured activity today. So, even if all the other assumptions have to be abandoned, if enough samples of absolutely known dates can be measured to construct a correction curve, then radiocarbon measurements can be made to find the position of a sample on this curve, and so its age can be inferred.

One laboratory has collected a series of samples of wood from long-lived trees, and has assigned dates to them by counting the growth rings. They have supplied such samples to the radiocarbon laboratories, and these dates are now widely accepted as providing a solid foundation for the radiocarbon chronology. Indeed, without this emergency footing, the radiocarbon clock would by now be so battered that it could hardly be trusted to give more than a rough idea of the true ages of things.

Now, if we are to believe the corrected radiocarbon dates, we must be ready to transfer our faith to tree-ring dating as the fundamental standard. How reliable is this new method? Let us examine it in the following article.

RADIOCARBON DATES

Linked to Tree Rings

THE title of the Twelfth Nobel Symposium was "Radiocarbon Variations and Absolute Chronology." The title implies that radiocarbon dating is no longer regarded as absolute. The emphasis in the symposium was on the variations in radiocarbon dates and

the attempts, only partly successful, to explain them. That which emerged as the absolute chronology was the one based on counting tree rings.

Is that bad news? After all, the method of radiocarbon dating is a specialized technical field for a few highly trained experts, and the theory has been corrected here and adjusted there until it is difficult even for other scientists to understand. On the other hand, everyone knows —doesn't he?—that a growing tree adds one ring every year around its trunk. And after a tree is cut down you can tell how old it was merely by counting the rings, can't you? What could be simpler than that? Doubtless many persons will be relieved to learn that the radiocarbon clock, which always smacked a little of scientific magic, is now being kept on time by something as easy and understandable as counting tree rings.

The calibration curve was included in the published report of the symposium (also published in *Scientific American,* October 1971). It shows, for each year back to about 5200 B.C.E., how many years must be added to or subtracted from the radiocarbon date to make it correspond with the tree-ring date.

At first glance you might mistake it for a chart of stock-market prices. Its lack of any regularity, its random short-term wiggles, and its unpredictable long-term trends all enhance the resemblance. By using this correction curve, the radiocarbon dating laboratories have come to rely fully on the accuracy of tree-ring chronology, also called dendrochronology.

So those who have put their faith in radiocarbon dates must now ask themselves whether that faith is strengthened or weakened by the new linkage to tree-ring dates. The answer, of course, depends on how certain the tree-ring chronology is. Is it a firm anchor for radiocarbon dates, to keep them from floating off into the unknown depths of antiquity?

Bristlecone-Pine Chronology

Not many trees live thousands of years. The magnificent giant sequoias that grow on the mountain slopes of California are famous for their extreme longevity. In recent years, however, it has been found that the bristlecone pine, an unpretentious, scrubby-looking tree that grows on high, rocky slopes in the southwestern United States sometimes lives even longer. One tree in Nevada is reported to be 4,900 years old.

The usefulness of this long-lived tree was first pointed out in 1953, by Edmund Schulman, of the University of Arizona. In the White Mountains of eastern California he found a number of very old trees, some of them still living, others now dead stumps or logs. He collected cores cut from living trees as well as the remains of fallen trees in the grove. He examined them in his laboratory and used them to set up a tree-ring chronology. After his death in 1958, this work was resumed by Professor C. W. Ferguson in the same laboratory. Ferguson reported the present status of the work to the Nobel Symposium. He claims to have established a tree-ring chronology for the bristlecone pine all the way back to 5522 B.C.E. This is a span of almost 7,500 years, a truly impressive accomplishment. Can there be any reason to doubt that it is correct?

Questioned by Some Researchers

Well, we may note that Professor P. E. Damon, of the geology department at the same university as Ferguson, said: "The accuracy of tree-ring dating may be questioned by some researchers."[8]* Then let us inquire into the procedure of construct-

* References are found on page 20.

ing a tree-ring chronology to see why it may be questionable.

The first thing we should ask about is the basic assumption of tree-ring counting, that one ring equals one year. It may surprise you to learn that this is not always true. Ferguson says on this point: "In some instances, 5 percent or more of the annual rings may be missing along a given radius that spans many centuries. The location of such 'missing' rings in a specimen is verified by cross-dating its ring pattern with the ring pattern of other trees in which the 'missing' ring is present."[9] Since the investigator adds these "missing rings" to his chronology, it is greater than the actual number of rings counted, by five or more years for each century.

Even more interesting is Ferguson's comment about the possibility that a tree may produce two or three rings in a single year: "In certain species of conifers, especially those at lower elevations or in southern latitudes, one season's growth increment may be composed of two or more flushes of growth, each of which may strongly resemble an annual ring. Such multiple growth rings are extremely rare in bristlecone pine, however, and they are especially infrequent at the elevation and latitude of the sites being studied."[9]

So, under present climatic conditions, multiple rings are rare. From a uniformitarian point of view, such a statement is reassuring enough. But this viewpoint overlooks the abundant evidence that the climate was much more temperate before the Deluge of 2370 B.C.E. Also, the present-day location of the bristlecone pine groves might then have been at a much lower elevation. Both of these differences, in harmony with the opinion quoted, could have resulted in more multiple rings in trees then living. This would have been true, not only before the Flood, but even for some time afterward, while the earth's crust was adjusting to new pressures. Who can say how often multiple rings formed under those conditions, or how many extra centuries are included in the chronology on that account?

Piecing the Patterns Together

The next point to note is that no single tree has 7,500 rings. Although it is reported that some standing trees are more than 3,000, and even 4,000 years old, the oldest living tree included in the chronology goes back only to 800 C.E. However, a dead tree was found with some 2,200 rings, and similarities in the pattern of thick and thin rings were found between the outer layers of the dead tree and the inner layers of the living tree. So the ages were considered to overlap from 800 to 1285 C.E., and the older tree was dated back to 957 B.C.E. This process was repeated with seventeen other remnants of fallen trees, ranging from 439 to 3,250 rings, to carry the ring count back a total of 7,484 years.

Now you may ask, How certain is the matching of the overlapping patterns? Ferguson assures us that there is only one possible way to make each of the seventeen fits; as he says: "The master chronology for all specimens involved is unique in its year-by-year pattern; nowhere, throughout time, is precisely the same long-term sequence of wide and narrow rings repeated, because year-to-year variations in climate are never exactly the same."[9] Some persons might be willing to accept this opinion at face value; other researchers might, as Damon says, be among those who question it.

Another question: If it were possible to fit a dead tree segment in more than one place, what considerations would guide the selection of the "correct" fit? This statement by Ferguson may give us a clue:

"Occasionally, a sample from a specimen not yet dated is submitted for radiocarbon analysis. The date obtained indicates the general age of the sample, this gives a clue as to what portion of the master chronology should be scanned, and thus the tree-ring date may be identified more readily."[10] And, again: "Radiocarbon analysis of a single, small specimen, that contains a 400-year, high quality ring series indicates that the specimen is approximately 9000 years old. This holds great promise for the extension of the tree-ring chronology farther back in time."[11]

Thus it is evident that the carbon-14 dating sometimes serves as a guide in fitting together the pieces of the tree-ring puzzle. Do these admissions give reason to suspect that perhaps the tree-ring chronology is not as well-anchored as it seems to be, but that its proponents look for support to radiocarbon dating? Such a suspicion is not unfounded, for Professor Damon, after assuring us of his personal confidence in tree-ring dates, adds: "Nevertheless, it is reassuring to have some objective comparison, for example, with another method of dating. This is, in fact, provided by carbon-14 dating of historically dated samples."[8]

If tree-ring dates need to be bolstered by comparison with radiocarbon dates in the range where they are supported by historical dates, back only 4,000 years, what is to be said of the need 4,000 or 5,000 years before that?

Problems in Dating Wood

The efforts to strengthen the mutual support of the two chronologies are plagued by another problem that occasioned considerable discussion among the experts. Even in radiocarbon analysis of those samples of bristlecone pine that now serve as the basis for all other radiocarbon dates, the possibility of sample alteration must be considered. It is known that inorganic substances, such as the limestone of shellfish and the carbonate in bones, are very susceptible to exchange with dissolved carbonates, either older or younger. For this reason they are almost useless for dating. Organic substances, such as cellulose, are regarded as unlikely to exchange. The live sap in a tree can be washed out of the dead wood, but if it has been circulating through the wood for centuries or millenniums, can we be sure that it has not partly replaced the decaying carbon 14?

Unlike the sap, resin is difficult to remove. Ferguson has referred to "the highly resinous nature" of bristlecone pine wood.[12] The experts agreed that resin from younger wood moves into the older wood, where it can cause errors. "The diffusion inward of the resin certainly is a reasonable result."[13] Also, "This resin problem is important, particularly as the correction increases as one goes further into the tree."[13] In one experiment, the extracted resin was apparently 400 years younger than the wood.

However, the experts disagreed as to how effective their chemical treatments are. One said that boiling the wood successively in acid and alkali "removes all of the resin."[14] Another said: "In my opinion, the resins in bristlecone pines cannot be removed completely by treatment with inorganic chemicals."[14] But when they use organic chemical solvents, they have to worry about whether the solvent has been completely removed afterward, because just a little modern carbon from it could apparently rejuvenate a sample of ancient wood. Of course, they work conscientiously to exclude all these errors, but are they completely successful? How sure can we be?

Glacial Varve Counting

A somewhat similar method of counting years into the past was discussed at the meeting, one based on glacial varves. Varves are alternate layers of sand and silt that are supposedly formed annually by a glacier as it melts. It is claimed that these provide a continuous record, one in Sweden going back as far as 12,000 years. This also was proposed as an absolute chronology to which radiocarbon dates might be tied. But how firm a basis is it, really?

NEXT ISSUE—SPECIAL!

Where Is Religion Leading Mankind?

The Scandinavian varve chronology is pieced together from sections observed in different places throughout the length of Sweden. The record appears much less useful than a tree-ring chronology, for several reasons.

For one thing, there is no link to the present day, corresponding to the bark ring. Estimates as to the date when the last varve was laid down vary widely. Also, the problem of identifying annual deposits contributes to the uncertainty. So one geologist dated the beginning of the series in Skåne at 12,950 B.C.E., another at only 10,550 B.C.E. Dr. E. Fromm, of the Geological Survey of Sweden, said: "In these cases the geological setting did not a priori limit the possible range of the datings, and the 'teleconnections' have obviously given quite unreliable results. Moreover, in these parts of Skåne doubts remain as to whether all varved deposits with sedimentation in small melt-water lakes are really annual varves."[15]

Note this admission that varves do not always correspond to annual deposits. In reality, they represent alternate conditions of rapid flow and slow flow, which might occur several times a year under some climatic conditions. "Dr. Hörnsten of the Geological Survey of Sweden pointed out that each varve had to be examined very carefully to avoid counting the varve from one year as two years. One single varve deposited during one year may have one or two pseudo-winter layers, due to variations in the discharge of melt-water (cf. double tree rings)."[16] Professor R. F. Flint, a well-known geologist of Yale University, asked for a clear statement of the criteria by which a varve is recognized, but so far as the record of the symposium shows, this was not forthcoming.[17]

These, then, are the "absolute chronologies" that were offered at the Nobel Symposium. From the articles in popular science magazines it would be easy to get the impression that radiocarbon dating is more firmly established than ever. But a careful reading of the backstage discussion at the Uppsala conference reveals that the uncertainties have multiplied. The radiocarbon theory no longer provides a sound basis for acceptance of its dates. The results of twenty years of study have greatly weakened most of its underlying assumptions.

Now reliance is placed on the work of a single research group on a new method —tree-ring dating. What additional weaknesses in this technique might be revealed by twenty years of intensive study in different laboratories? In its present status, would you be willing to rely upon it, rather than on the Bible, for the vital decisions you must make in the near future?

SCIENTIFIC OR Bible CHRONOLOGY -Which merits your faith?

MOST persons who read the Bible, even casually, know that the human race is about six thousand years old. But they may not know what Bible texts point to that age. Perhaps you have seen in some Bibles the date 4004 B.C., in the marginal column at the first chapter of Genesis.

Do you know whether that date is correct, or what reasoning it is based on? Then what if you see a news item about a new radiocarbon measurement showing that an archaeological site was occupied by primitive men eight or nine thousand years ago? Do you wonder how certain the Biblical date for creation really is? Or does the thought cross your mind that maybe the evolutionists are right after all?

Conscientious students of the Bible know that its Author is an exact, painstaking timekeeper. They have followed the texts that give the exact number of years from one outstanding event to another. They know how the ancient chronology of mankind, kept only in the Bible, links up with reliable historical chronology, so that accurate dates can be put on the happenings recorded from Adam's creation in 4026 B.C.E. onward.

More than this, they know that the Bible, as a prophetic book, often linked time features with future events that came to pass exactly in the year foretold. Many now living have personally witnessed the fulfillment of the long-range prophecy of the "times of the nations," which extended into this twentieth century. They saw the outbreak of World War I in the predicted year 1914, ushering in the period of distress from which this world is destined never to recover.

They now look to this decade for the completion of the six thousandth year of man's existence. They are confidently hopeful that the seventh 1000-year day will bring the millennial reign of the Prince of Peace.

Mature Christians are familiar, through their study and experience, with the accurate chronology of the Bible. To them the idea that God could have been mistaken in the time of man's creation, or that he would have been so careless in providing and preserving the record that we today would not have this vital information, is incredible. When scientific chronologies that contradict the Bible chronology are introduced, they say with calm confidence that the scientists must be wrong, because 'God cannot lie.'—Titus 1:2.

Now, you may be one who does not share this confidence. You may wonder: Can we really put faith in the Bible account of man's creation, when it seems so out of line with what scientists are learning? If the radiocarbon dates for early human settlements are correct, then the Bible dates must somehow be wrong, and how do we know where we are on the stream of time? Worse yet, if the Bible timetable is not reliable, maybe other things in the Bible are not trustworthy either. So can we really depend on it?

If dating by the radiocarbon clock

makes you hesitate to accept wholeheartedly the Bible promises of a new order, we invite you to consider carefully the information presented in the preceding two articles. Do not credulously accept the opinions of scientists as the ultimate truth in matters that so vitally affect your future. Remember how often scientific "facts" of one generation have been discarded by the scientists of the next generation. Look at the radiocarbon theory itself, how many of its basic assumptions have had to be modified to bring it in line with recent studies. Without the support (sometimes very questionable) of samples dated by other means, radiocarbon dating would now be a very uncertain business. Would you consider it wise to abandon your faith in the Bible only to replace it with faith in a scientific theory as unsettled as this?

The structure of carbon-14 dates was found to be so rickety farther back in time that it needed emergency support—tree-ring counting. Will you put faith in such a structure?

Carbon-14 Dates a Rickety Structure

The scientists who participated in the 1969 symposium at Uppsala came away with a feeling that progress was being made in understanding and surmounting their many problems. They took particular satisfaction in comparing radiocarbon dating and tree-ring counting. Even though the tree-ring chronology has pushed the radiocarbon dates rather badly out of shape, their proponents did come to an agreement. They were able to construct a mutually consistent correction curve, and to give plausible explanations for the major trends of deviations.

However, it may well be that neither of these scientific chronologies are as independent as their supporters would like to believe. Perhaps they are depending on circular reasoning. Do the radiocarbon workers believe their dating is correct because the tree-ring laboratories verify it? And are the tree-ring researchers satisfied that their master chronology is correct because the radiocarbon dates fit on it? As long as they are within the channel marked by historical buoys, they both steer a reasonable course, but in the misty depths beyond, they sail away with no constraint but to keep one another in sight.

Lest you think this is an unfair judgment, just look at some of the crosswinds and countercurrents that the radiocarbon pilot has to face:

(1) The half-life of radiocarbon is not as certainly known as the scientists would like.

(2) The cosmic rays, never steady, may have been much stronger or weaker in the past 10,000 years than is generally believed.

(3) Solar flares change the level of radiocarbon—how much in the past nobody knows.

(4) The earth's magnetic field changes fitfully on a short time scale, and so radically over thousands of years that even the north and south poles are reversed. Scientists do not know why.

(5) Radiocarbon scientists admit that an "Ice Age" could have affected the radiocarbon content of the air, by changing the volume and temperature of the ocean water, but they are not sure how great these changes were.

(6) They ignore all the evidence, both scientific and Biblical, for a worldwide deluge forty-three centuries ago, so they do not recognize the drastic effects that such a cataclysmic event must have had on the samples they measure from that period.

(7) Mixing of radiocarbon between the atmosphere and ocean can be affected by changes in climate or weather, but no one knows how much.

(8) Mixing of radiocarbon between the surface layers and the deep ocean has an effect, very imperfectly understood.

(9) The count of tree rings, used to calibrate the radiocarbon clock, is cast into doubt by the possibility of greatly different climatic conditions in past ages.

(10) The radiocarbon content of old trees may be changed by diffusion of sap and resin into the heartwood.

(11) Buried samples can either gain or lose radiocarbon through leaching by groundwater or by contamination.

(12) It is never certain that the sample selected to date an event truly corresponds with it. It is only more or less probable, in the light of the archaeological evidence at the site.

This is by no means a complete listing of the pitfalls that beset radiocarbon dating, but it should be enough to give a person pause before he throws out his Bible. Many of them would not seriously affect dates in the recent past, but their influence mounts up with time. So the method works reasonably well up to 2,500 or 3,500 years ago, but as we go farther and farther into the past the results become more and more doubtful. We could not expect that the radiocarbon clock would run the same before the Deluge as it does today. And it would be surprising if it could settle down completely within a thousand years after such a blow.

Note particularly the last point on the above list. Even if everything else about radiocarbon dating were correct, if some flecks of charcoal dug up at the site of Jarmo in Iraq are found to be 6,700 years old, does that prove the Bible wrong? Does it not rest on the interpretation of the archaeologist who collected the sample? Is he infallible? Even if he assured you that his sample is unmistakably, indisputably, irrefutably genuine, is his belief a sound basis for your faith?

In weighing the evidence, do not overlook the most significant result of radiocarbon dating, namely: Of all the dates found for samples associated with man's presence, the vast majority, perhaps more than 90 percent, have turned out to be less than 6,000 years ago.

If the evolutionists' ideas about man's having been around for a million years were correct, surely we would expect to find a much larger number of artifacts dated back 10,000 or 20,000 years, within the range of carbon 14. Why do nearly all the specimens fall within just the past 6,000 years? We do not expect a scientific measurement to speak with the authority of a trusted eyewitness. It can only offer circumstantial evidence. But statistically speaking, the radiocarbon clock throws the weight of its testimony overwhelmingly on the side of the creation account, and

against the evolution hypothesis, of man's origin.

Weak Links in Tree-Ring Chronology

On the face of it, the method of counting tree rings seems to be much more straightforward than carbon-14 measurements. However, we find on closer inspection that there are weaknesses in the chain of overlapping patterns. No two trees have exactly the same pattern of thick and thin rings. Missing rings have to be supplied to all the patterns, in order to fit them together. Are we to believe that the analyst's judgment is always correct in deciding where to put the missing rings? If they were inserted in different places, is it possible that the overlap might fit better in another part of the record? We are told that sometimes a carbon-14 date already taken on the wood helps put it in the right place. Without being prejudiced by this information, or perhaps being prejudiced toward trying to fit the total record into a shorter time, is it possible that another analyst would accomplish an equally good match? These are crucial questions, if we are to decide whether to put more faith in a count of tree rings than in the count of years recorded by the writers of the Bible.

As with all scientific conclusions, there are limits to the reliability of tree-ring dating. It appears that some trees can count the years, allowing for some stumbling over missed rings and double rings, and they hold their count long after they have died. But dead trees do not, of themselves, tell when they started or when they stopped counting. The man who pieces the patterns together has to decide that, and his opinions and prejudices cannot be excluded from this subjective decision. Would you be willing to risk your life for the proposition that he had made no error?

Would you be willing to take the word of any scientist, however prestigious, that radiocarbon dating with the support of tree-ring counts have now made it certain that there was no flood in Noah's time such as the Bible describes? Jesus Christ said there was such a flood. (Matt. 24:37-39; Luke 17:26, 27) God himself has had this account recorded in his inspired Word. Whose authority would you rather accept in making a life-or-death decision?

Superiority of Bible Chronology

Compare these scientific systems of chronology with that in the Bible: "Shem was a hundred years old when he became father to Arpachshad two years after the deluge. . . . And Arpachshad lived thirty-five years. Then he became father to Shelah. . . . And Shelah lived thirty years. Then he became father to Eber." (Gen. 11:10-26) This is a chronology kept by men who could count, without missing any years or counting any twice, and who could keep written records of their count. And we too can count, and we can add up the years in their record from the Flood until now, 4,340 of them. Is this not more credible than counting and correlating rings in trees long dead, or counting layers of sand, or trying to balance all the factors of uncertainty in a radioactive clock?

Bible chronology has a unique superiority over scientific chronologies. It goes into the future. The radiocarbon clock runs down, ever slower and slower, but without any end point. The tree-ring chronology stops with last year's growth. But the Bible chronology directs our attention to a definite point, still future—the end of six 1,000-year days of man's history, as counted by his Creator.

The Bible's past record of forecasting future dates is impressive. Biblical chronology was published by Jehovah's Chris-

tian witnesses' foretelling 1914 as the date for the tremendous change in earth's affairs that then took place. Said the New York *World* on August 30, 1914: "The terrific war outbreak in Europe has fulfilled an extraordinary prophecy. For a quarter of a century past, through preachers and through press, the 'International Bible Students' . . . have been proclaiming to the world that the Day of Wrath prophesied in the Bible would dawn in 1914. 'Look out for 1914!' has been the cry of the . . . evangelists."

That year 1914 was a date so plainly marked that modern historians cannot overlook it. And it is no mere coincidence that this decade is marked by many forward-looking scientists as the one that will see the world facing chaos and final disaster from a dozen inexorable forces that already are converging fatally upon it. What success of the radiocarbon clock can compare with this record of the Bible in pinpointing dates?

Dr. Säve-Söderbergh, of the Institute of Egyptology at the University of Uppsala, recounted this anecdote at the symposium:

"Carbon-14 dating was being discussed at a symposium on the prehistory of the Nile Valley. A famous American colleague, Professor Brew, briefly summarized a common attitude among archaeologists toward it, as follows:

" 'If a carbon-14 date supports our theories, we put it in the main text. If it does not entirely contradict them, we put it in a footnote. And if it is completely "out of date", we just drop it.'

"Few archaeologists who have concerned themselves with absolute chronology are innocent of having sometimes applied this method, and many are still hesitant to accept carbon-14 dates without reservation."[18]

Worldly scientists are still reluctant to accept the results of radiocarbon dating, when no more harm would be done than to upset their cherished theories. Then should not Christians with far stronger reason be reluctant to accept as truth a scientific chronology that is being revised constantly in its basic theory, leaning for support first on one crutch and then another? Why should they accept it when its results flatly contradict a Biblical chronology that has been maintained by scrupulous chroniclers and protected by divine supervision, that has stood the tests of both historical and prophetic accuracy, for thousands of years? Surely it is the Bible, which shows we are living in the "last days" of this wicked system and that God's righteous new order is near—it is the chronology found in this book that merits our faith.

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WHICH WAY for DUTCH CHURCHGOERS?

BY "AWAKE!" CORRESPONDENT IN THE NETHERLANDS

THESE are disturbing times for many churchgoers in the Netherlands. For several years now a growing number of them have become deeply troubled by what they see going on in their churches.

That they do not like what they see can be noted by the fact that church attendance is dropping. In the Roman Catholic Church, weekend attendance has decreased from 64 percent in 1966 to 45 percent in 1970.

Protestant churches are in much the same condition. The largest is the Dutch Reformed Church. In Amsterdam, that Church's attendance dropped from 47,000 to 37,000 in the ten years ending 1970, a decrease of 21 percent.

The despair has also infected the ranks of the clergy. In all of the Catholic dioceses in the Netherlands, only four priests were ordained in a recent year! But 95 died and 95 others quit in that same year! Also, during 1970 a total of 243 priests of all orders and 156 friars left their offices.

Hostile Attitude Grows

Some churchgoers have built up great hostility toward their churches. One Roman Catholic man was so irritated that he told an interviewer: "Everything that goes on in the Catholic Church is blasphemous. How dare they still keep the church doors open?"

As a matter of fact, church doors are not kept open as much as before. They used to be kept open day and night, but for the past few years many of them have been kept open only during services. This is because thievery of church articles is rampant.

A priest in Roermond, Netherlands, has nailed down or screwed down the most valuable articles in his church. A sightseer who was visiting a church in the same city, while admiring valuable objects displayed in a showcase, was cautioned by a curate: "Do not come too close so as to touch those wires. They are highly charged with electricity."

Chaplain A. van Can from the same city says: "More and more often it happens that there in the confessional someone just sits down to shed excrement." He also noted that "some even urinate in the holy water font."

How can such indecency in an area so predominately Roman Catholic be explained? The clergyman said: "Nobody knows. In these Catholic areas the church was something holy in earlier days. But now for large groups this is gone. Suddenly the church has no meaning for them anymore."

Why is all this happening? What is causing so many churchgoers, even clergymen, to be so disgusted with their churches?

Some of the Reasons

One reason for the problems in the Catholic Church is that the Dutch Church is at odds with the Vatican. The Dutch Church has continued to press for change, for 'renovation.' But the Vatican has fought to stem the tide and has made countermoves. One such was the appointment of a very conservative bishop to the influential Rotterdam diocese. This was contrary to what most of the churchgoers there expected or wished.

On the other hand, some people express bitterness at the changes others want. They see that the Dutch Church has dropped certain teachings or practices that only a few years ago were considered most holy. They wonder if they were fooled originally, and whether they are being fooled now.

Another matter that is causing much irritation is the attitude of many clergymen toward sexual morals. An example is their attitude toward homosexuality. There are an estimated 650,000 homosexuals in the Netherlands, about 5 percent of the entire population. Some of the clergy find it popular to be tolerant toward homosexuality.

Two clergymen who are themselves homosexuals recently wrote a book entitled "We Too Are Homosexuals" in which they tried to justify their immoral course. Their stated purpose was to write a book for "Christian homosexuals."

In November 1971 a forum consisting of spokesmen for various religious groups discussed a proposal made to a high religious official. The proposal was to allow private religious celebrations of homosexual 'marriages.' In the discussion it was suggested that it would be appropriate "that the [homosexual] partners affirm the given pledge of faithfulness before the presence of God during the celebration and that the priest would implore God's blessing."

The forum included "Father" J. B. F. Gottschalk and "Reverend" A. Klamer, a well-known radio pastor. The "high religious official" was none other than Bernard Cardinal Alfrink, who reacted favorably to the suggestion. Many sincere churchgoers are extremely disturbed about this tolerance toward homosexuality. It has caused great confusion in their minds.

In addition, people do not feel that they are getting proper religious guidance. This is often due to the 'modernism' that has gained such force in the Catholic Church's teachings and practices. Church services now include addresses by politicians, entertainers and homosexuals. Often there is music from a 'beat' or 'rock' band, which distresses many, especially older persons.

A churchgoer in Amsterdam expressed his indignation as follows: "These gals in hot pants on and about the altar on Sundays, by way of example, have been a source of annoyance to us for a long time; the use of sex and drugs in the parish café under the church as well. After a police raid there, it was announced from the pulpit that the officers had merely walked in to ask directions. Also, when one parent lodged a complaint that one's child had not come home for three days, then you got to hear this from the priest: 'Jesus too used to go on three-day sprees and he would always show up again.' "

The Basic Cause

Why is there such confusion in the Dutch churches? Why are clergymen arguing and contradicting one another? Why are they teaching things that seem so unreasonable to many people?

The basic cause is that the churches and their clergymen are more and more push-

ing aside the only source of sound Christian doctrine. That sound doctrine is found in the inspired Word of God, the Holy Scriptures. As 2 Timothy 3:16, 17 says: "All Scripture is inspired of God and beneficial for teaching, for reproving, for setting things straight, for disciplining in righteousness, that the man of God may be fully competent, completely equipped for every good work."

Christianity is based on those Holy Scriptures. However, when the Bible is watered down, contradicted or abandoned, then there has to be trouble in the ranks of those professing to be Christians. You cannot undermine the very foundation of Christianity without causing upheavals, because the Holy Scriptures are the basis for keeping Christian unity.

One way the clergy abandon and contradict the Bible is in their condoning or excusing homosexuality. For instance, in the previously mentioned forum, priest Gottschalk stated that the wrongdoing of the inhabitants of ancient Sodom was not their homosexual acts. Instead, he claimed that their wrongdoing had to do with "the fact that the law of hospitality was sinned against." He also said in an interview with *Elseviers* magazine: "Homosexuality as a constitutional disposition lies completely outside the perspective of the Bible."

But that is not the truth. It is a direct contradiction of God's own written Word on the matter. For example, Jude 7, written by a disciple of Jesus Christ, says, according to the Catholic *Douay* version of the Bible: "Sodom and Gomorrha, and the neighbouring cities, in like manner, having given themselves to fornication and going after other flesh, were made an example, suffering the punishment of eternal fire."

What "other flesh" did they go after? Genesis chapter 19, verses 4 and 5 states: "Before they could lie down, the men of the city, the men of Sodom, surrounded the house, from boy to old man, all the people in one mob. And they kept calling out to Lot and saying to him: 'Where are the men who came in to you tonight? Bring them out to us that we may have intercourse with them.' " Without question, then, these were men who wanted to commit homosexual acts. God annihilated the city because of these homosexuals.

Likewise the apostle Paul said of such sexual perversion: "The males left the natural use of the female and became violently inflamed in their lust toward one another, males with males, working what is obscene." God's Word says that those who do such vile things are "deserving of death." It also notes that persons who "consent with those practicing" homosexuality are persons who have "exchanged the truth of God for the lie." —Rom. 1:24-32. See also 1 Corinthians 6:9, 10; Leviticus 18:22, 29.

In spite of the Bible's very clear statements on this matter, the *New Catechism,* published in 1966 at the urging of the bishops of the Netherlands, states: "That the Holy Scriptures express themselves very severely as to genital homosexual contact must not be erroneously understood. They do not do this to denounce the fact that some people experience this aberration within themselves not due to some fault of their own."

This weak, indulgent and Scripturally wrong attitude toward homosexuality is due directly to the critical attitude so many clergymen have toward the Bible. They have an exaggerated opinion of their own ideas, ideas which often clash, head on, with God.

Another example of this is the claim by many clergymen that the Bible contains myths. A parish priest in the Catho-

lic province of Noord Brabant told a dentist's widow and also one of Jehovah's witnesses that as far as he was concerned Jesus was not the Son of God and that he had not been born of a virgin. The priest also said that if he (the clergyman) had been born in Thailand he very likely would have become a Buddhist priest instead of a Roman Catholic priest because that religion was also something good. He stated that, while Jesus Christ was tied in with Western culture, in other cultures there were other roads leading to salvation. He said he did not agree with Jesus' statement in John 14:6: "No one comes to the Father except through me."

Clergymen in the Dutch Reformed Church have been guilty of the same watering down of God's Word. This is recognized even by some clergymen of that religion. Recently several of its theologians sent an open letter to members of the church calling attention to the crisis in the church. They noted that "in many cases the preaching gives preference to doubts above certainty, to discussion above doctrine, to human opinion above the testimony of the Holy Scriptures."

With such belittling, watering down and contradicting of God's Word by church leaders, is it any wonder that many Dutch churchgoers are confused and bitter? As one of them said of the clergy: "If the shepherds are such, what are we sheep to do?" He answered his question by declaring: "Well, we will just go our own way!"

Going Their Own Way

The number of dissatisfied ones going their own way keeps increasing. Some choose to conduct their own church services in buildings closed down by the official Church.

In other places some have formed the so-called "interparishes" or the "Church-within-the-official-Church." These people do not agree with the many changes in the Dutch Catholic Church and want to keep things the way they used to be, so they want churches and priests and a bishop of their own.

Others who live near the border of Germany attend churches there because they approve their services more. Then there is a segment of 'progressive' priests who call themselves the "Septuagint Group." They want to set out on their own course and break with the official Roman Catholic Church. Then, too, there are the growing multitudes who simply abandon all religion.

However, an increasing number of persons have come in contact with Jehovah's witnesses. Either by the home visits Jehovah's witnesses make, or because these persons have friends or relatives who are Witnesses, they learn of the free home Bible study arrangement offered by Jehovah's witnesses and take advantage of it. In this way they search their own Bibles for answers to the reasons for the present crisis in religion, and what God's solution is. They get to see that many controversial matters within the church systems are easily cleared up by adhering to the testimony of the Holy Scriptures.

At present, there are in the Netherlands about 10,000 individuals and families who are having such home Bible discussions. These sincere former churchgoers are finding out what the Bible really says about religion that pleases God. And they are also learning about God's grand promises to bring an end to wickedness soon and to replace this corrupt system of things with a new order. In that new order, they learn, righteously disposed persons will have the opportunity of living forever. —2 Pet. 3:13.

APPLYING BIBLE COUNSEL PROMOTES FAMILY UNITY

DO NOT a home where a peaceful atmosphere prevails something truly desirable? How fine it is when children freely communicate with their parents, sharing their joys as well as their problems and disappointments! And it is indeed refreshing when the dominant spirit in a home is one of love and affection instead of quarreling, nagging and strife.

But how can family life be changed for the better? Many families have found that their application of the things learned through a study of the Bible has been an invaluable aid.

● A family in Okinawa came into a desperate financial situation. To get something to eat for the family the wife collected empty bottles to sell. When the husband was at home, she would constantly pour out her complaints. So he stayed away as much as possible. Eventually one of Jehovah's witnesses called at the home and, from the Bible, explained to the wife the cause of the trouble and suffering on earth. She agreed to have a home Bible study. After a few studies she realized that what she was learning was really the truth. Soon she started to attend the meetings held by Jehovah's witnesses and began to share with others the good things she had learned. She also recognized her mistakes in dealing with her husband, recalling the Bible text that compares a contentious wife to "a leaking roof that drives one away." (Prov. 27:15) Consequently, she changed her course of action. Instead of constantly complaining, she restrained her tongue and pursued peace.

As a result the husband no longer stayed away from the home, but began studying the Bible with a Witness. Today this family is rejoicing in a pleasant home atmosphere, for all are united in striving to apply Bible principles in their relationships with one another.

● Similarly, the application of Bible principles brought an end to constant quarreling for a married couple in Surinam. The wife began studying the Bible with Jehovah's witnesses. But there were repeated quarrels in the home, especially when it was time for the Bible study or when the wife got ready to attend the meetings of Jehovah's witnesses.

The climax came when the wife decided to attend the program every day at a circuit assembly of Jehovah's witnesses. Her husband locked her out of the house, not opening the door until a long period had passed. Even when he finally let her in he spoke angrily. However, the wife wanted to put into practice the fine principles she had learned from her home Bible study. When she remained silent, her husband became even angrier. Then she said calmly: 'Just listen a moment. You know how I acted formerly, don't you? Whenever we had a quarrel, I always wanted to have the last word and do most of the talking. But now that I am studying the Bible and reading *The Watchtower* and *Awake!* regularly I do not want to quarrel with you anymore. If you want to quarrel with me, go ahead. But I will not reply to your quarreling any longer.'

Immediately the man calmed down. He could not believe his ears. If what his wife was learning produced such fine results, it was worth investigating. He then said: 'I must also begin reading those magazines and books of yours, because they taught you something worth while.'

● A family in Jamaica was also drawn closer together through a study of the Bible. Although living in the same house, each family member went his own way. Then a young lady in this family began to study with Jehovah's witnesses. Of particular interest to her was Jesus' prophecy at Matthew 24 concerning the "conclusion of the system of things." Eagerly she invited her mother to share in the study.

The mother consented, but mainly to see what her daughter was learning. Because of common interest developing through their study, both became aware that the "generation gap" was narrowing. The daughter also spoke to her sister. But later this sister was persuaded by a clergyman to stay away from the Witnesses because, he said, 'their religion breaks up families.' However, this sister saw that just the opposite was happening in her own family. Eventually she and three other members of the family began to study the Bible with Jehovah's witnesses. Thus six persons who had lived independent of one another were united by means of the message of God's Word.

Surely the application of Bible counsel can bring unity to families. Is that not reason enough to give serious consideration to the contents of God's Word?

TRAVEL—HONDURAN STYLE

By "Awake!" correspondent in Honduras

OUR 175-mile trip is a two-day journey, and our bus leaves at 3 a.m. We are traveling to San Pedro Sula from our home on the Caribbean coast of Honduras. As we climb aboard the bus, we note that it is full, so we have to stand for five hours in the back, next to the luggage in the rear compartment. But we are on our way.

As we look over our fellow passengers, we see persons of Indian background and persons of Spanish ancestry. Then there are the *Morenos,* Negroes whose ancestors came from Africa. How colorful the women's dress is! And the men with their straw sombreros and sparkling eyes greet us, even at 3 a.m., with a happy, *"Buenos dias."*

As the bus winds its way along the sandy road through the jungle, we bounce along listening to the buzz of happy conversation. Every so often we stop to pick up or discharge passengers. At one of the stops, there is a man selling iguanas. He has about twenty of these jumbo lizards with their legs trussed up, tied by their tails to a stout pole. Some of the passengers lean out of the windows and purchase these dragons of the jungle to prepare for a meal when they arrive at their destination. We only hope that they are not going to be put with the luggage in the part of the bus where we are. Much to our relief the iguanas are placed on top of the bus with the excess luggage, for we would not relish riding next to a live, four-foot-long iguana.

It is interesting to view the "manaca" houses in the villages as we pass by. The houses are made of poles tied together with vines. The house is then daubed with mud or clay and is plastered over with bright red clay. The roof is made of poles and covered with long branches of the manaca palm. We are told that these palm tree roofs will last for six years, keeping out the tropical heat and winter rains. These homes with their bright red roof and high clay walls are indeed a colorful sight.

Finally our bus reaches the railroad station. Here in several manaca buildings we can sit in the shade and drink a beverage made from powdered milk, fruit flavoring and shaved ice. There is no hurry. We even visit a nearby village, as we have a considerable wait.

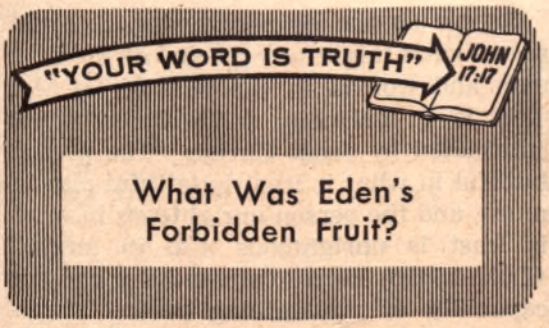
The train finally arrives, and people rush to get aboard, including many women with heavy bundles carried on top of their heads. The train is pulled by a modern diesel engine, but the cars must date from the turn of the century. We find that all the seats are taken. The only place left to ride is at the end of the cars, on the outside where the cars join together. We pick a place on the steps and get settled, noting that there are eighteen others riding on the platform with us, baggage and all. The hours pass quickly as we enjoy the breathtaking scenery.

Our train makes very few stops, and in between it just slows down so that people can either jump on or off. We see one fellow racing down the tracks behind the train on his horse, trying to catch the train. As he nears the train he stops to tie his mount to a tree and the train outdistances him. We watch as he again races to catch the train, only to be foiled by a narrow bridge. We last view him as he races off on a jungle trail, presumably to get aboard at another spot ahead on the line. Getting off the train can be just as much of a challenge.

One young woman jumps off the train and falls into the soft grass alongside the tracks, and a young man jumps off with a baby in his arms and lays it gently in the grass. Someone throws off the lady's baggage. Next she picks up her baby and her bundle of clothes and she disappears in the thick foliage. Does that sound strange to you? To these people it is not.

At our next stop, we are surrounded with many little girls and boys and some women who are selling tamales, a tortilla plate, filled with fried fish plus *frijoles,* or beans, fried *platanos,* which are like French fries except that they are sweet. If we are thirsty we can buy a *coco de agua,* a coconut filled with sweet milk, opened on the spot by a girl with a machete. She wields a two-foot-long blade and whacks off the top of the coconut, leaving a hole just large enough so that we can drink this delicious tropical treat.

Soon we are on our way again, and late at night we reach our destination, San Pedro Sula. What an enjoyable, exciting trip it has been, traveling Honduran style!



What Was Eden's Forbidden Fruit?

"IF Adam and Eve had not eaten the forbidden fruit, no babies would have been born. And so where would we be?" Persons who bring up this point believe that the sin of Adam and Eve involved sex relations. But is this belief reasonable? More importantly, is it Biblical?

God's command, as found at Genesis 2:16, 17, reads: "From every tree of the garden you may eat to satisfaction. But as for the tree of the knowledge of good and bad you must not eat from it, for in the day you eat from it you will positively die."

At the time this command was given to Adam, he was alone in the garden, for the creation of the woman is not mentioned until later in the account. (Gen. 2:21, 22) The command itself likewise shows that Adam was by himself. In the original Hebrew text, the word "you" is in the singular. Therefore in languages that have both singular and plural forms for "you" (such as French, German and Spanish) the singular form appears in the prohibition, "You must not eat from it."

So, how could the forbidden fruit pertain to sex relations, when Adam was the only human on the earth?

One's interpreting the command about the forbidden fruit to signify sex relations also contradicts the positive command given to the first human pair to procreate. They were told: "Be fruitful and become many and fill the earth." (Gen. 1:28) How unreasonable, unjust and unloving it would have been for Jehovah God to encourage the filling of the earth and then to prohibit, under pain of death, the having of sex relations!

The narrative of Genesis chapter 3 provides still further evidence against the forbidden fruit's involving sex relations. The Bible record states: "The woman saw that the tree was good for food and that it was something to be longed for to the eyes, yes, the tree was desirable to look upon." Manifestly, not sex relations, but the fruit of a literal tree could be described as "good for *food.*" Noteworthy, too, is the fact that Eve did not present some of the fruit to Adam until she herself had partaken of it. Since Eve was not with Adam when she ate the forbidden fruit, how could her sin have been sex relations with her husband? —Gen. 3:6.

But some persons may feel that the reference to a fruit on a tree must be a childlike way of illustrating something much greater forbidden by God. The Biblical narrative, though, provides no basis for this conclusion. It should be remembered that, with the exception of the one tree, Adam was permitted to 'eat from every tree of the garden to satisfaction.' So if the "tree of the knowledge of good and bad" was not an actual tree with real fruit, what were the other trees in the garden? There is no reason for believing that they were anything else but literal trees. Genesis 2:9 plainly says: "Jehovah God made to grow out of the ground every tree desirable to one's sight and good for food and also the tree of life in the middle of the garden and the tree of the knowledge of good and bad." Thus all the trees, including the tree of the knowledge of good and bad, literally grew out of the ground. However, the kind of fruit borne by the tree of the knowledge of good and bad is not specified in the Bible.

While the Genesis account may appear very simple, what it says has deep significance. The fruit of the tree of the knowledge of good and bad was not poisonous but wholesome, literally "good for food." So God's restriction regarding this fruit was the only thing that made eating of it bad. The tree was therefore a fitting symbol of the right to determine or set the standards of good and bad, which right God reserved for Himself by forbidding Adam to eat thereof. This prohibition emphasized man's proper dependence on God as his Sovereign Ruler. By obedience the first man and woman could demonstrate that they respected God's right to make known to them what was "good" (divinely approved) and what was "bad" (divinely condemned). Disobedience on their part would have signified a rebellion against God's sovereignty. This understanding of matters is acknowledged in a footnote of the modern Catholic translation known as *The Jerusalem Bible:* "The first sin was an attack on God's sovereignty, a sin of pride."

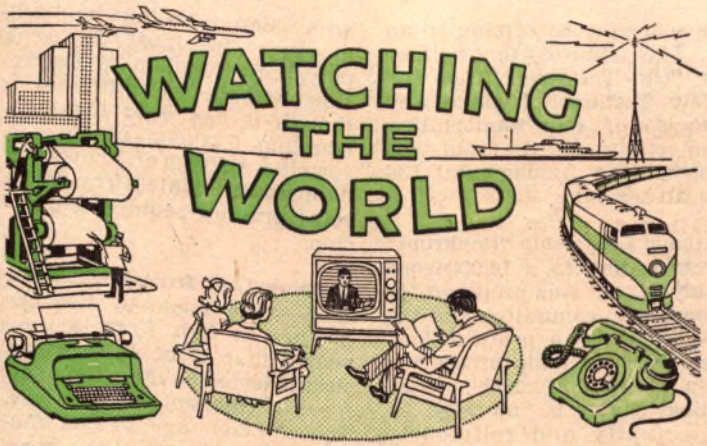
The command itself was of a nature that we would expect from a God of love and justice. There was nothing unreasonable about it. Neither Adam nor Eve were thereby forced into a difficult situation. They were not being deprived of necessities for sustaining their life. There were many other trees in the garden from which they could eat to satisfaction.

The command also showed the highest regard for man's dignity. Originally given to Adam, it attributed no base or degraded inclinations to the first man, inclinations that needed to be kept under control by a specific law. For example, Jehovah did not say to Adam: 'You must not commit bestiality.' No, the command involved something that was completely natural and proper: eating.

Simple as the command was, it could reveal what might be expected of the first man and woman in the way of loyalty. This is in harmony with the principle enunciated by Jesus Christ: "The person faithful in what is least is faithful also in much, and the person unrighteous in what is least is unrighteous also in much." (Luke 16:10) Both Adam and Eve had the capability of maintaining perfect obedience. On this basis, no one today can say that the death sentence was unjust.

For us today it is vital that we exert ourselves so as not to fall into the same line of reasoning as did Adam and Eve. Though Adam was not deceived, the rebellion of his wife apparently caused him to lose faith in his heavenly Father's ability to work out matters to his blessing. Seemingly he even took offense against Jehovah God, saying: "The woman whom *you* gave to be with me, she gave me fruit from the tree and so I ate." (Gen. 3:12) As for Eve, she was completely deceived. Through the serpent's words, Eve came to believe that Jehovah God was keeping her low and in ignorance. Thus she came to view disobedience, independence from God, as the way to happiness.

Remembering that what Adam and Eve did in eating an actual, but divinely forbidden, fruit signified rebellion against Jehovah's sovereignty, we should want to make it our determination to remain loyal subjects of our Creator. Never do we want to be deceived into thinking that God's laws are unjust and not in our best interests. Regardless of what circumstances may develop, we, unlike Adam, ought to keep before us the fact that Jehovah God can and will bless his devoted servants. We have the Biblical assurance, confirmed by numerous examples throughout human history, that Jehovah God is the "rewarder of those earnestly seeking him."—Heb. 11:6.



Devastating Flood

◈ Water held back by a pile of waste material from a mining operation in West Virginia inundated 14 mining communities when the pile gave way on February 27. At the beginning there was a wall of water ranging from 20 to 50 feet high as it rushed downhill wrecking most of the homes in its path. Floating bodies were found 24 miles downstream. It was estimated that 5,000 people were displaced from their homes.

Spectacular Argentine Fire

◈ A spectacular fire swept through a shantytown in Buenos Aires totally destroying it a few months ago. The fire left 700 people without homes and caused damage running into the millions of pesos. The cause of the fire was idolatry on the part of a woman who owned a bar. When she closed the bar to go home she left a candle burning in front of an effigy of her favorite saint, and it was the flame of this candle that ignited the inferno that destroyed the shantytown.

Transporting Oil Through Water

◈ Using the principle that water and oil do not mix, an oil company has devised a method for transporting crude oil through an unheated pipeline. This makes possible the operating of oil fields formerly regarded as uneconomical. The new method uses water as a surrounding shield that prevents the oil from coming in contact with the sides of the pipe and experiencing frictional drag from the pipe. In a 24-mile experimental pipeline, the company is moving 27,000 barrels of heavy crude oil daily. The volume of liquid in the pipe consists of 70 percent oil moving as a core through a surrounding shield of water that makes up the remaining 30 percent.

British Unemployment

◈ There is growing concern in Great Britain over the unemployment problem. Nearly one third of those out of work have not been able to find a job for more than six months, and they have exhausted their unemployment payments. Reporting on it, *The Guardian Weekly* commented: "Men's pride and their will to work can be permanently damaged by the prolonged idleness. . . . Our society is not in a condition when it should take such hardship lightly."

Unstable Youthful Marriages

◈ According to statistical evidence released by the U.S. Census Bureau, people who marry young are twice as likely to seek a divorce as those who marry when older. The figures showed that 27 percent of those who married before they were twenty years old later got a divorce, as compared with 14 percent of those who married after their twentieth birthday. It was also found that the presence of a child during the first two years of marriage doubled the possibility of divorce because many of these children were the result of premarital pregnancies.

Struggling Newspapers

◈ Foreign-language newspapers in the United States are struggling to continue in existence. Since 1940 nearly two out of three have gone out of business, a total of 730 newspapers. The older generation of foreign-speaking people are the mainstay for the papers left, but they are dying off. The Jewish paper *Daily Forward* had a circulation of 200,000 in 1920, but now it has only 45,000. The German-language paper *New Yorker Staats-Zeitung und Herold* once had a circulation of 180,000. Now it has only 12,000. There are 440 surviving foreign-language papers, many of them losing money and readers.

Automated Car

◈ A step toward an automated car now makes it possible for a car automatically to operate the throttle and brakes in response to changing traffic conditions. A radar sensor on the grille detects hazards ahead and automatically adjusts the speed of the car. Sensors near the tail lights solve the problem of blind spots and warn the driver audibly or visually of vehicles approaching from the rear. A backup sensor is activated when the car is put into reverse and warns the driver of such objects as small children, tricycles and other objects that might be in his way but below his line of vision.

Operating with Stored Blood

◈ Men of science are constantly developing new methods for performing surgical

operations. *The Journal of the American Medical Association*, dated November 15, 1971, described a procedure for open-heart surgery that employs "sever hemodilution." Early in the operation a large quantity of blood is drawn off into a plastic blood bag. Though the bag is left connected to the patient by a tube, the removed and stored blood is no longer circulating in the patient's system. It is replaced with a plasma volume expander, which dilutes the blood remaining in the veins and which gradually dissipates during the operative procedure. Near the conclusion of the operation the blood storage bag is elevated, and the stored blood is reinfused into the patient. The New York *Times* of November 9, 1971, reported on a somewhat similar procedure whereby some days before one undergoes surgery as much as four pints of blood are removed and stored. During the operation the person's own stored blood is transfused back into him, thus avoiding the danger of disease and mismatched blood. These techniques are noteworthy to Christians, since they run counter to God's Word. The Bible shows that blood is not to be taken out of a body, stored and then later reused.

Needless Surgery

◈ In testimony before the Commission on Medical Malpractice, Dr. Sidney Wolfe estimated that 10,000 Americans die every year as a result of two million needless operations. It is always advisable to get the opinion of more than one doctor before submitting to surgery. Doctors differ in their opinions and skills.

Doubts About Soul Immortality

◈ The Lutheran theologian Krister Stendahl, dean of the Harvard University Divinity School, was reported by the Minneapolis *Tribune* as saying that the tradition of "speaking about the immortality of the soul may be coming to an end." He admitted that neither the "Old Testament" nor the "New Testament" make any promise of soul immortality. Immortality of the soul has long been a fundamental Lutheran teaching.

Catholic Leadership "Bankrupt"

◈ According to a 14,000-word analysis that was prepared for a bishops' committee on the priesthood by a priest-sociologist, the leadership of the Roman Catholic Church in the United States is "morally, intellectually and religiously bankrupt." He claims that most priests reject various teachings of the church, such as those on birth control, celibacy and divorce. He also stated in the report: "Many priests under 40 no longer believe a thing that the collective hierarchy says, no longer take seriously any of their instructions, and no longer have any confidence in their capacity to lead."

Dwindling Seminaries

◈ Although the Catholic church is badly in need of more priests, its seminaries which have supplied her priests are rapidly declining in number. In just the middle part of the United States 12 of 33 seminaries have closed since 1967. In the entire country approximately 45 have closed. Enrollment has dropped 19 percent since 1967, but in the middle states of the country the drop was 39.3 percent. A Franciscan priest observed: "Not only do we find fewer students going to the seminary, we find almost 40 percent of the new seminarians drop out."

Vatican Changes Rules for Converts

◈ On February 17, the Vatican issued new rules for converts to Catholicism. In countries where polygamy is practiced a convert may participate in Catholic religious life even though he has more than one wife. Before being baptized, however, he must forswear polygamy. Baptism by immersion will be permitted even though it has been the long-standing Catholic practice to sprinkle instead of immersing baptism candidates. The Scriptural practice requires immersion.

Hearing Loss from Rock Music

◈ A study made by two ear doctors in San Francisco revealed that 41 of 43 rock musicians tested by them have suffered permanent hearing loss. The average age of the musicians is 22, and they have been performing from one to six years. Their hearing loss was evident before a performance and outstandingly after a performance. It apparently is due to the high sound level used in rock music. Although some experts believe that the safe sound level is 75 decibels, rock music often reaches 140 decibels. The hearing of listeners can be affected even more adversely than that of the musicians because the musicians are behind the loudspeakers.

Antibiotic Resistance

◈ It has been a long-time practice among manufacturers of animal feed to add antibiotics to the feed. Chicks, calves and pigs are said to grow more rapidly when given antibiotics. This practice also has made possible the raising of thousands of chickens in a relatively small area and cattle on crowded feed lots. But the Food and Drug Administration is becoming concerned about the practice. It appears that bacteria in the poultry and cattle are producing strains that are resistant to antibiotics. This resistance could, according to the Commissioner of the Food and Drug Administration, cause a "health hazard" to man. There is the possibility that if these resistant bacteria were to infect man,

antibiotics would be powerless to fight the infections.

Soap and Lotion Warning

◈ Skin specialists are taking a closer look at soaps and lotions that contain a chemical known as TBS. Some of these doctors claim that toilet soaps and after-shave lotions containing this chemical are causing a number of people to become allergic to sunlight. Even when they sit near a window, the light coming in can cause their skin to break out with scaly, itchy sores. This has caused some skin doctors not only to stop using soaps and lotions with antibacterial agents but to recommend that their patients stop using them as well. They contend that germ-killing soaps are not needed by people generally. They point out that normal skin bacteria have a protective role in fighting disease-causing bacteria.

Harmful Chemical in Meat Products

◈ The Food and Drug Administration discovered potentially hazardous levels of nitrosamine chemicals in samples of processed meat. They apparently developed from compounds like nitrate salts that are used as antibacterial agents and for improving the appearance of meats that are cured. Some laboratory animals developed cancer after being given these chemicals.

Undersized Brains and Kidneys

◈ Canadian research scientists are searching for a substance in cigarettes that causes pregnant rats to have offspring with undersized brains and kidneys. The kidneys weigh 25 percent less than normal and the brain 10 percent less. Total body weight was down 20 percent. Cigarette smoke was breathed by the rats at a rate equal to what a woman would breathe when smoking a package of cigarettes a day.

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