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Chapter One

TIME: THE PSYCHOLOGICAL ACCOUNT

Time, like an ever-rolling stream,
Bears all its sons away.

So go the opening lines of one stanza of Isaac Watt's well-known hymn.

It expresses the common sense view of the flow of time, a steady stream of something in which we live, carrying us along in its current, flowing always at the same speed and in the same direction, and passing across the stage of our experience like a tape upon which events are being indelibly impressed. It comes out of eternity and passes on into eternity, allowing us an opportunity to act out our little part in the allotted span.

It has a reality apart from our consciousness since it obviously continues to flow by while we sleep. Moreover, it was unreeling before we were born and continues to unreel after we are buried. It is as endless as eternity. It is in fact co-existent with eternity, and differs only from it by being a measured stretch of current that has direction of flow, rather than the immeasurable stillness of eternity that simply exists everywhere without movement. At least, so it seems. . . .

Nothing happens outside of it because it is inconceivable that it could. There has always been time, and all events are embedded in it, even creation itself. Before the universe existed, time must have been passing even in eternity, while God was making his plans. When the world comes to an end, we have to ask how there can possibly be "no more time" (as Revelation10:6[1] seems to say) since God and the angels surely continue, and so will we as God's children. At any rate, such is the common sense view of things.

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[1] "And [the angel] swore by him that lives forever and ever, who created heaven, and the things that therein are, and the earth, and the things that therein are, and the sea, and the things which are therein, that there should be time no longer." Revelation 10:6.

Yet experience tells us that the flow of time is not always the same. Sometimes it accelerates. At other times it slows up. Perhaps it can even stop altogether! Whatever may be the truth of the matter, experience tells us that our personal measurement of time is highly variable. Fifteen minutes under the probings of a dentist can be an age. One hour in front of our favourite TV programme is gone in a moment. The time that lovers spend together is no time at all!

The common sense view tells us that time is constant in its flow, unvarying and unending. But experience challenges this, now and then.[2] Let us explore the circumstances under which such challenges may arise. They seem to depend on some factors that are *external* to ourselves and some factors that are *within* ourselves.

Some of the external factors are such things as the time of day, environmental temperature, darkness, extended periods of absolute silence, total deprivation of sense stimulation, and involvement in a threatening situation or an actual accident.

Some of the internal factors are age (childhood, maturity, or senility), body temperature (whether due to fever or to environmental conditions), hypnosis, the action of drugs or poisons, potential starvation, and sex (whether male or female).

Other internal factors are extremes of pain or fear, pleasure or excitement. These, too, effectively distort our awareness of the passage of time, the former enormously slowing it up and the latter substantially accelerating it. It has been observed that, in retrospect, we retain only vague memories of what was happening when time was dragging, but vivid memories when time was flying. It is as though our estimate of time is somehow adjusted to the intensity of our awareness.

Body temperature

One of the first investigators to conduct quantifiable experiments relating to the effect of body temperature on time was Hudson Hoagland of the Worchester Foundation for Experimental Biology in the United States.[3] When his wife had influenza and was running a high temperature (104° F.), he happened to notice that her ability to estimate time was significantly disturbed. On an occasion of an emergency visit to the local drugstore on her behalf which had occupied not more than twenty minutes by the clock, she was absolutely certain that he had been gone for at least an hour. There was such a remarkable discrepancy in her time sense that

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[2] On some research done in this area, see Alton J. DeLong, "Phenomenological Space-Time: Towards an Experiential Relativity", *Science*, vol. 217, 7 August, 1981, p. 681.

[3] For work done by Hudson Hoagland, see Herbert Woodrow, "Time Perception" in *Handbook of Experimental Psychology*, edited by S.S. Stevens, New York, Wiley, 1951, p. 1231; and also John Cohen, "Psychological Time", *Scientific American*, vol. 211, no. 5, 1964, p.117, 118.

he decided to investigate it. To this end he designed a number of experiments, and these experiments revealed a very clear straight-line relationship between her temperature and her error in estimate of the time interval.

He instructed her to count to sixty at what she believed to be one second intervals. He used a stopwatch and noted precisely what number she reached in her counting when one minute had lapsed by the clock. He repeated this a number of times as her temperature fluctuated, and for each clocked minute he plotted her total count against her temperature. He found, for example, that when her temperature registered 97.4° F., she had counted to 60, when in fact the clock showed only 52 seconds had passed. By the time her temperature had risen to 103° F. she had counted to 60 when in fact only 34 seconds had passed. Thus the estimated passage of time had clearly accelerated for her, flowing through her consciousness at almost twice the normal speed. By extrapolation from Hoagland's data one may suppose that when her temperature reached 104.2° F, time would appear to pass at twice the speed. The scatter of Hoagland's figures shows remarkably little variability in count for successive estimates at any given temperature over the range from 97° F. to 103° F., the relationship being clearly a straight line one. As her temperature rose, her sense of the passage of time steadily accelerated and she reached a count of 60 in less and less time. At the height of her fever, when he went to the drugstore, her count must have been almost three times as fast as it should have been, so that his 20 minute absence seemed to her more like 60 minutes. It is therefore apparent that psychological time is significantly temperature dependent.

The French have for many years been particularly interested in this subject. Long before Hoagland's experiments, a French psychologist, Henri Pieron, suggested that because a subject's psychological time sense is exaggerated at higher temperatures, the speed of the operation of the brain itself must have accelerated, chemical reactions at a higher temperature taking place at a higher speed.

Hoagland thus concluded that there is some kind of chemical pacemaker in the brain, a sort of temperature regulated balance wheel in our psychological clock that governs our subjective sense of the rate at which time is passing through the mental recorder. Its seconds intervals (like the tick of a clock) are shorter or longer depending on the temperature of the tissue, and our unconscious computer that tells us when 60 seconds have passed is out of register with the time told by a mechanical time piece — unless the time piece also forms part of our computer's frame of reference.

We measure time by change. But change has to be perceived and perceiving involves some kind of activity of the mind that is almost certainly linked to the electrochemical processes of the brain. So we now suspect that altered temperatures upset the normal operating speed of these processes. The higher the temperature, the more rapidly the "frames" are recorded and the greater the number of them per time

unit: the lower the temperature, the more slowly they are recorded and the fewer of them per unit of time.

The hibernating animal whose temperature steadily falls until he finally goes to sleep, probably skips straight from the picture of the last day of autumn to the first day of spring. There is no experienced interval in this "skip." The eye of its mind therefore takes only two photographs in that interval — the first falling snowflake and the last melting icicle. The intervening winter is by-passed entirely. As a sun dial counts only the sunny hours, so the animal's consciousness perceives only the warm days. On its last wakeful day in the fall, the sun declines more and more slowly as its own temperature falls and it loses consciousness even before the sun has actually set. It is months later that one day in the spring as the warming sun rises higher in the morning and the environmental temperature allows the animal to return to a waking state, it opens its eyes to see the sun already risen. In the interval it has not known that the sun was daily continuing its circuit across the sky. Kaleidoscoping its last moments of wakefulness in the fall with its first day of wakefulness in the spring, it had not actually seen the sun go down at all. The winter months have simply been eclipsed. There have, in fact, been no intervening winter sunsets.

What if the only creatures alive were creatures like this? Their picture of the world would be the only reality they could know and they might very well assume that it was *the* reality. We are in much the same position, except that we depend on mechanical clocks rather than biological ones, and these mechanical clocks continue to run even when we are unconscious. Nevertheless, it is we who have set the speed at which they go, according to the speed at which we have sensed the sun in its journeyings.

A "real" rate of flow of time?

It is true that this is all subjective. Yet the question arises whether the flow rate of time that is normal to human experience may not actually be determined by the mean temperature at which our bodies operate. This temperature is remarkably constant for all men all over the world — at the equator, in the tropics, in temperate zones, and even in the Arctic. Thus if body temperature does regulate time sense in any way, we all agree pretty well on the speed at which time is passing, i.e., at what speed the sun is making its daily round. . . . and therefore at what speed to set our mechanical clocks.

But what if we lived on a planet where the normal body temperature happened to be 104° F. (as it is in birds) instead of 98° F.? Of course, the sun would go across the sky at its own fixed rate, whatever that happens to be, but if we with our new time sense perceived it to be going more slowly than it now is and accordingly set our clocks to match its slower time, how could we ever discover it?

How then can we know what the objective flow rate of time really is? We naturally assume that there is some such objective flow rate for the Universe but we cannot tell what it is for sure because it is locked into our stream of consciousness, and this is determined by our temperature.

We ourselves as part of the system cannot know whether our time sense reflects the actual passage of time. Perhaps God observes the movements of the Universe at twice the speed we do, or only at half the speed we do. To Him who stands outside of it, uninfluenced by temperature or any other such factor, time may pass at an entirely different rate, the "actual" rate one might say. Thus there could be a general conspiracy to which all objective time markers within the system are party, and we assess the flow rate of all these markers in the context of our own consciousness. We set our clocks to keep *our* time as determined by the speed at which *we* observe the passage of the sun across the sky of *our* experience. We filter these signals through our minds and every kind of marker is forced through the same filtering process, both the clocks we make and the length of the day by which we set them. Of this filtering process we are unaware.

"Actual time," whatever that is, may be much faster or much slower than we apprehend it to be. Our time may depend upon the mean temperature at which our minds operate. If all life on some other planet operated at a temperature of, say, 70° F. or 110° F., the time frame would be very different. Presumably the *order* of events would remain the same but the time intervals between these events, and therefore the speed at which things happen, would be experienced very differently. The problem is that we could only discover it if we, unlike that other planet's inhabitants, wore some kind of insulated clothing to keep our body temperature precisely where it now is, while we visited with them.

Such, then, is one of the factors which conceals from us the "real" rate at which time flows by.

Size

Now it is also possible that the *size* of our bodies relative to the Universe has a bearing on how we experience the passage of time. To a tiny insect with a life span of only a few hours, a geological age would be an eternity. The size of an organism obviously has a bearing simply because a highly complex creature of large proportions needs more time just to reach adult size, and thus has to "take longer at meals" in order to get enough food to sustain itself and to grow up. Cell division and multiplication proceeds at a certain "normal" rate, and obviously the larger the number of cells that have to multiply to generate the adult organism the longer the time it will take. Within certain very loose limits a larger animal will have a longer life. The insect that lives for a few hours presumably passes through all the phases of maturing and the experiences which accompany them from birth to death in those

few hours. Though it is difficult to conceive of it, it seems likely that such a creature would pass through its carefree childhood, anxious adolescence, bored middle life, and disappointed old age: and who knows but that it looks forward in its childhood to a lifetime as stretching out before it, or thinks back in the retrospect of old age upon what is past, in a way which is somewhat analogous to the human situation. This may not be true of insects, of course. But it seems likely that it is partially true of such a creature as a dog whose life span is nevertheless only about one fifth of ours. So size obviously has a bearing on experienced time. One Victorian writer, Ambrose Bierce, wrote:[4]

> Magnitude being purely relative, nothing is large and nothing is small. If everything in the Universe were increased in bulk by one thousand diameters, nothing would be any larger than it was before. To an understanding familiar with the relativity of magnitude and distance, the spaces and masses of the astronomer would be no more impressive than those of the microscopist.
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> For anything we know to the contrary, the visible universe may be the small part of an atom with its component ions floating in the life-fluid (luminiferous) of some animal. Possibly the wee creatures peopling the corpuscles of our own blood are overcome with the proper emotion when contemplating the unthinkable distance from one of these corpuscles to another.

Malebranche was quite right when he exclaimed after looking through a microscope for the first time: "This is the end of *size."*[5] He might with equal justice have said, "This is the end of *time."* In neither case would it have been intended that there was no more size or no more time but only that both were entirely relative. And we should remember that, when we speak of something as being relative, we also mean relative *experientially.*

Lifespan

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[4] Bierce, Ambrose: quoted by E. L. Hawke in a written communication for the discussion of a Paper presented by F. T. Farmer, "The Atmosphere: Its Design and Significance in Creation", *Transactions of the Victorian Institute* (England), vol. 71, 1939, p.54, 55.

[5] Malebranche: quoted by John Taylor, *Man in the Midst,* London, Highway Press, 1955, p.15.

Man lives three score years and ten. The period is long enough relative to the life of an insect to make our estimate of time very different. Did we live as long as the pre-Flood patriarchs who survived for almost a thousand years, a geological age might strike us as not quite such a long period, and an historical epoch might seem very brief.

There are among us a small number of unfortunate individuals suffering from a disease called *progeria* which brings about a frighteningly accelerated rate of aging of the body. Within a period of ten to fifteen years these people pass through infancy and childhood, adolescence, middle age, senility, and death. Each stage is marked by all the symptoms more or less characteristic of a normally spanned life. By the age of twelve or so, the sufferer is already an old man, decrepit in physique, hard of hearing, dim of eye, bald and toothless, shrunken in appearance. All the tell-tale marks associated with old age are evident, even sometimes to the hardening of the arteries. One foot is already in the grave.

To such individuals, we who survive to the presently allotted span of life must appear as the pre-Flood patriarchs do to us. A corollary of this would naturally be that, to the pre-Flood patriarchs, we who think we are in health would actually appear as pitiful progeriacs. And possibly this is the truth of the matter: but because we have come to accept our present life span as normal, we discount the records of antiquity as unbelievable.[6]

While they are reported to have lived to almost a thousand years, we may live to almost a hundred: and while we live to almost a hundred years, the progeriac lives to about ten. The proportions are curiously much the same — ten to one. Who can say what a normal life span really is, or ought to be? But now, if our life time passes at a normal rate for us, did the pre-Flood patriarchs live at a much slower rate? Did time therefore seem to pass much more slowly in each of their days? Who knows whose biological clocks are actually telling the right time? We don't know what a short time is or a long time: and it seems virtually impossible for us ever to find out how long *long* is. Their one thousand years may have seemed to them, experientially, no longer than our mere three score years and ten. The progeriac, in his "younger" days, perhaps watches those around him growing slowly into potential Methuselahs, while he himself experiences the flow of time at a "normal" pace.

Hypnosis

Hypnosis can have an even more dramatic effect on time sense than changes in body temperature. Experiments were reported in *MD Canada* in 1966 in which,

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[6] Progeria: for the implications of this disease upon the Genesis record of longevity, see Arthur C. Custance, *The Seed of the Woman*, Hamilton, Ontario, Can., Doorway Publications, 1980, p.26-28.

under hypnosis, subjects could be made to experience a thousand discrete "events" in an interval of five clock seconds.[7] L. F. Cooper of the University of Georgetown suggested to a hypnotized patient that a metronome which was actually beating once per clock second was beating at a much lower rate.[8] He demonstrated that it was possible for a subject to accept the suggested time scale and fit it into her dreams. The passage of only a few minutes was accordingly experienced as an interval of several hours. In another report, in one dream lasting three seconds as measured by brain wave activity, a subject *imagined* that 4800 seconds had passed during which time she was able to pick and count 862 bolls of cotton. This meant that in her new time frame she actually picked and counted one boll of cotton every five seconds, which would not be unreasonable in a real life situation. But one cannot consciously count 862 of *anything* in three seconds under normal conditions. To do this in three seconds of clock time indicates that hypnosis had an extraordinarily accelerating effect upon her conscious activity or a decelerating effect upon her consciousness of the passage of time. Who knows but what we ourselves may wake up some day and find that our whole life has in effect passed in a moment or two of *real* time — as Psalm 103:15 and 16 almost seem to suggest.[9]

Drugs

Some drugs have the effect of so slowing up the time at which things happen that the subject appears to have been provided with 'more time' to examine events that normally occur too rapidly for comprehension of what is happening. One has to put the words *more time* in quote marks because we do not really know whether this is the way to describe the situation or whether it is the mental processes that are enormously speeded up instead. Constance Holden speaks of a pianist who under the influence of drugs worked out an interpretation of a Bach toccata, condensing what she considered to be eight hours of practice time in ten minutes of trance time.[10] She also refers to a song writer who during a drug-induced trance imagined that she

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[7] "Biologic Time" in Science Report, *MD of Canada*, vol.7, no. 2, Feb., 1966, p.47.

[8] Cooper, L. F., "Trance Slows Down Time", reported in *Science Newsletter*, 15 May, 1948, p.311.

[9] "As for man, his days are as grass: as a flower of the field, so he flourishes. "For the wind passes over it, and it is gone; and the place thereof shall know it no more." Psalm 103:15, 16.

[10] Holden, Constance, "Altered States of Consciousness: Mind Researchers Meet to Discuss Exploration and Mapping of Inner Space", *Science*, vol. 179, 1973, p.983.

walked down a street into a cabaret, ordered a sandwich and a beer, and then listened to a singer rendering three songs. All of this took place in a clocked time interval of only two minutes. Afterwards she was able to sing the songs, each one of which was new to her. This was done entirely by normal speed recollection of events which had been imagined under drugs at a vastly accelerated rate.

Drugs like hashish and marihuana are very potent in this respect. Time contraction can be measured in several different ways, the usual one being the subject's estimate of the number of events happening during the trial period of time.

In discussion on certain aspects of consciousness at the 1968 Alpbach Symposium held in Austria under the aegis of Arthur Koestler, J. R. Smythies commented on the fact that hallucinogenic drugs enormously distort our sense of time, sometimes elongating it to such an extent that one second may seem like a hundred years.[11] Objects falling to the ground at the usual speed are observed in slow motion so that they can be examined as they fall, and what happens at the point of impact can be leisurely studied in ways not possible in normal life. Unfortunately, the details of what was observed are not always clear afterwards. It is as though a moving film of events has been photographed at a thousand times its normal speed but the picture is then projected onto the screen of consciousness at a normal speed so that the time sequences are dramatically retarded. Again, fortunately or otherwise, if the subject's own actions are involved in the sequence as something more than mere observer, his or her actions take part in the decelerated time frame so that nothing gets out of register.

We must include in any discussion of the effect of drugs some mention of the effect of reduced oxygen. This may result from exposure to high altitude, for example. When Major D. Simons made his remarkable balloon ascent in 1957 to an altitude of 102,000 feet, his physical condition deteriorated until at one point his speech over the intercom system had slowed to one quarter of its usual speed.[12] He was apparently quite unaware of this change. It is not reported whether he heard the answering message at a similarly much slower speed, as seems probable.

Darkness

Not only is our inner clock disturbed by temperature changes and hypnosis and drugs, but even *darkness* can upset it somewhat. John S. Kafka in 1957 reported that a series of uniformly spaced sound signals given to an observer both in the light

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[11] Smythies, J. R., "Aspects of Consciousness" in *Beyond Reductionism*, edited by A. Koestler and J. R. Smythies, London, Hutchinson, 1969, p.248.

[12] Simons, Maj. David G., "A Journey No Man Has Taken", *Life*, 2 Sept., 1957, p.19ff.

and in the dark, were estimated to have been more widely spaced in the dark.[13] And these findings have since been verified by other experiments of a similar nature.

Shock

For some reason a shift in time sense may occur during the *shock* of an accident. A professor friend of mine in the University of Toronto some years ago told us of a personal experience in which during a car accident he witnessed everything in slow motion immediately after the moment of impact. The glass windows slowly shattered and fell out, the door beside him slowly swung open as the car took a leisurely roll, and he found himself slowly passing out of the car and floating through the air towards the ditch. Evidently upon hitting the ground he lost consciousness, for he had no further recollections. When he came to, his time sense was once again normal. It was only in retrospect that he was able to recall this strange process of slowing up. In spite of the opportunity that the deceleration of events would seem to have provided for evasive action, he was not able to take advantage of it because his own movements were correspondingly slow and therefore ineffective. The temporary reprieve that such a circumstance would appear to offer was thus canceled out.

I suppose that there is an element of shock in being rudely awakened by an alarm clock. At any rate, it is not an uncommon experience to reach out and sleepily turn it off, noting that one has a few minutes of grace so that a moment or two in bed is still allowable. One enjoys the soporific sense of relaxation after the sudden awakening: and the next thing one is asleep again. Then suddenly one awakens with an apprehensive start fearing one has over-slept far beyond the appropriate time perhaps as much as half an hour or more! Visions of a wild dash to the office, a breakfast missed, and the last train or bus caught by a hair's breadth flash through one's mind. But then a quick glance at the clock brings the startling realization that one has lapsed into sleep again for only a minute, or perhaps two at the most. Almost every one has had this experience. The amazing thing is how long the lapsed time often seems to be, when in fact it can often be measured in seconds.

These time sense distortions are, of course, distortions and nothing else, since the rest of the world continues to experience contemporary events within a "normal" time frame. They have nothing to do with Einstein's theory of the relativity of time. They are psychological and subjective. But in spite of their subjectivity they are real, and there is some evidence that they can be linked to such unlikely factors as the *age* and/or *sex* of the individual.

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[13] Kafka, John S., "Method for Studying the Organization of Time Experience," *American Journal of Psychiatry*, vol. 114, no. 6, 1957, p.546-553.

Time sense in children, men, women

For example, LeComte du Nouy undertook a number of studies of the differences in time sense between children, men, and women, and concluded that they were real. He wrote about them at some length subsequently in a book entitled *Biological Time*. Here he observed:[14]

> Time does not have the same value in childhood as in later years. A year is much longer, physiologically and psychologically, for a child than for a man. One year for a child of ten corresponds to two years for a man of twenty. . . . The time lapsed between the third and seventh years probably represents a duration equivalent to fifteen or twenty years for a grown man.

Du Nouy believed that the capacity to absorb knowledge in a very young child was correspondingly far greater than in the adult, including the comparatively effortless learning of several languages concurrently. Children have more time, more *psychological* time, but not more *chronological* time. He also concluded that there is a real difference in the time sense of the adult man and the adult woman.

A man's time sense is particulate, fractional, an hours-minutes-seconds kind of time sense. A man very consciously counts time, saves it, loses it, wastes it, does many other such things with it as though it were being parcelled out to him in bits and pieces of a size convenient to the task which occupies it. Du Nouy believed that the male had a kind of inner clock, the ticking of whose mechanism he was somehow aware of. In England when the Gregorian calendar was adopted in 1752 and September 3rd suddenly became September 14th, general rioting resulted on account of the fact that workmen felt they had been robbed of eleven days of their lives, eleven whole days of life that personally belonged to them. A man tends to be more conscious of delay because of this inner clock. Western man makes clocks with smaller and smaller divisions until he can now measure a millionth of a second. He assumes that the measurement of a fraction of a second represents an absolute measure of some strictly objective reality: a sixteenth of an inch, let us say, of the tape that has been wound on the spool to the right.

According to du Nouy, a woman's sense of time is somewhat different from a man's, and the two divergent senses are cause of not a little confusion and sometimes friction. Her sense of time is not fractional or length oriented, but *event* oriented. He reasoned that this results from the various cycles which regulate a

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[14] du Nouy, Lecomte, *Biological Time*, New York, Macmillan, 1937, as quoted in his *Human Destiny*, New York, Longmans, Green & Co., 1947, p.208.

woman's experience throughout life, most of which are not experienced by the male. These cycles are essentially related to child-bearing, puberty, monthly periods, gestation periods, menopause, and so forth. The result is that a woman is timing life, not by the even spacing of the minutes or the hours in the way that a man times his, but in cycles which are much longer and not nearly so precise. The intervening time spaces are not attended to in the same way.

When a woman responds to her impatient husband as he waits to take the family to the theatre, by saying "Coming, dear, right away," she does not mean this literally. She means only that at that moment this is the next event she has in mind: to join her husband. Meanwhile, he makes a mental note of her reply and allows her forty-five seconds to make the trip from her bedroom to the front door! Consequently, he is frustrated when, ten minutes later, he is still pacing up and down the hall. . . .

Neither party seems able to accept the other's sense of time. And children have the same problem with grownups.

Flow rate of time: absolute or relative?

It is clear, therefore, that time does not have a fixed spending value in experience. It does not flow at a uniform rate through the consciousness of each individual. If we were all drugged alike, the passage of time might be universally accelerated or decelerated: and no one would detect it. Our mechanical clocks would be part and parcel of the conspiracy and their observed rate would simply reflect our drugged perception and share in the same acceleration or deceleration. Just as, if we were to double the size of the Universe and everything in it, we would also have doubled the size of our yardstick, so that the Universe would measure exactly what it did before! The same is true with time. If time passed for all of us at twice the speed or dragged for all of us at half the rate that it presently does, we would not be aware of any change.

This variability is entirely subjective of course — or at least we *assume* it is. Actually, we have no way of knowing whether there really is — somewhere —an objective flow rate of time or an actual yardstick for size. We build our clocks by our consciousness of the time it takes the earth to complete one revolution about its axis, and our calendar around the time it takes the earth to circle the sun. We observe the rate of the revolution of the earth and try to make sure that the rate of the revolution of the clock hands is in agreement: but in either case it is, after all, by our consciousness of this rate that we are guided. Some other smaller people on some other larger planet might be surprised at our assessment of how fast time flies, especially if what we call a drugged state is the normal state for them, or if their body temperature is running much higher or much lower than ours.

Thus the rate of time's flow lies in our consciousness. It is relative, to us. There is no way in which we can say how fast it is flowing by until we specify whose time we are talking about. Whose time is right? Moreover, there is no absolute ground for assuming (as we commonly do) that the flow rate of time is the same everywhere in the Universe. And God's time and our time may be very different things, not perhaps in the *direction* in which it flows but in the *rate* at which it flows.

One might argue that the sun determines the rate, not we. So it does. But it is important to realize that if our inner clocks all ran at one tenth of their present rate we would simply see the sun moving correspondingly more slowly across the sky, and we would still see our clocks keeping time with that movement. It would not be necessary to re-set our clocks. Our reading of the sun as moving at a slower rate across the sky would be exactly matched by a similar reading of the movement of the minute and hour hands of our clocks, even if they were one of these new types which are claimed to have such tremendous accuracy. Pendulum clocks are highly dependable, but they too would be seen to slow up or to accelerate. The swing of the pendulum back and forth would be matched to our perception of the speed of the sun in its circuit, because we would make sure that it did. On the basis of this swinging pendulum we might make our calculations of the value of gravity and though they would be adjusted to our time sense, they would still be correct. In short, nothing would change. Only some super-natural being who was not locked in as part of our space/time frame of reference, who could look on without becoming entangled with our metabolic acceleration or deceleration, would be able to observe what was happening to us. We ourselves would not be aware of it if we were *all* involved.

Nevertheless, we still feel confident that somewhere there is indeed a *real* time rate, and that it is only our *sense* of time that is upset — not the time rate itself. We recognize that we are all alike immersed in a psychological time frame from which we cannot escape. But we all agree, or did agree until Einstein came along, that the flow rate of time itself had an absolute quality about it.

What, then, did Einstein really mean when he said that time is relative? Did he only mean that the *sense* of time is relative, while the flow of its current moves on at a speed that is invariable? Did he mean only that we experience time at different rates but that this variability is only in the consciousness of the observer? The answer is, No! This is not what he meant. He meant that time does *not* have a fixed flow rate, that its flow rate really *is* variable, that this variability is not dependent on the observer!

Before we turn to examine the implications of what Einstein proposed, implications which have since been very widely confirmed by experiment and observation, it will be well to see that Western man has often lagged behind people of other cultures in their understanding of the "real" nature of time. We shall then

be in a better position to use this new understanding as a means of explaining a number of important passages of Scripture — some of which have hitherto appeared to be in contradiction with each other in disconcerting ways.

☞ PROCEED