"Summer follows winter, new moon follows old, day follows night. . . . The universe is not static; every component from an electron to a galaxy is continually moving and such movement cannot proceed forever in the same direction. Sooner or later it must complete a circle, or stop and return in the opposite direction."

—J. L. Cloudsley-Thompson

4 *Cycles in You*

Nature and all its components fluctuate in cycles. Her greatest creation, your body, is no exception.

You breathe, and your lungs expand and contract in rhythm. Your heart and pulse join in the anatomical parade—but their cadence is different from that of your lungs. Your blood pressure and blood flow are also cyclical, as are your adrenal secretions, your bile production, and your body temperature.

Even your brain operates in a rhythmic way (see Figure 4), producing wavelike electrical impulses that range from one wave every few seconds to very rapid impulses of thirty or more per second, an important factor in medical diagnosis of various diseases.

Amazingly the bacteria in your body have a cycle of abundance—just like the lynx, the salmon, and the partridge.

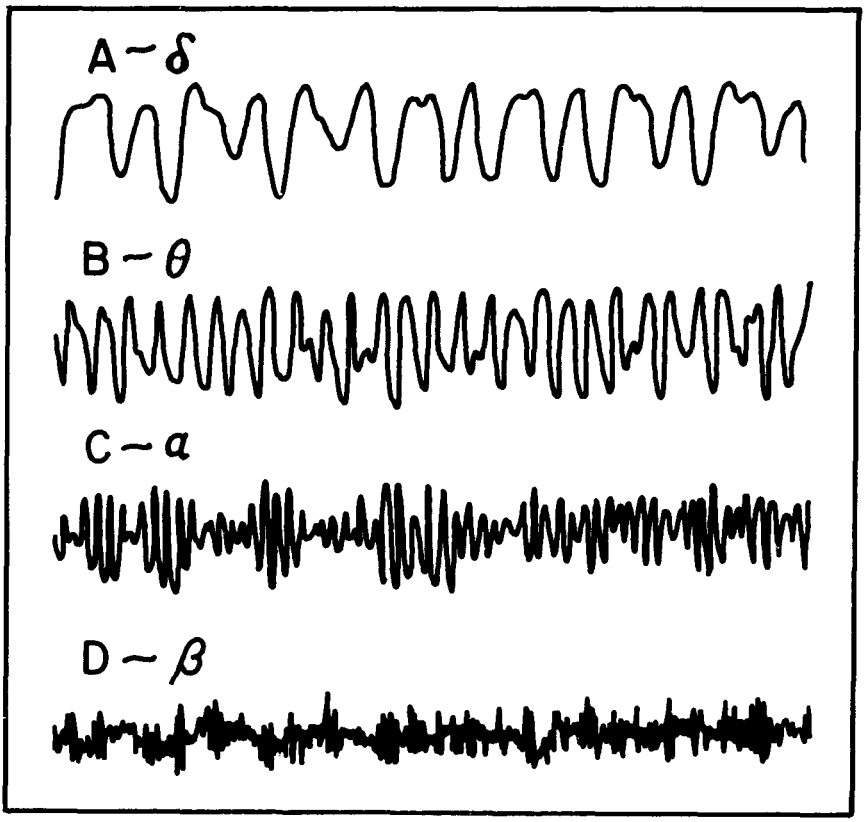

Fig. 4. Cycles in Brain Waves

The four main types of brain waves (after Walter).

Your Daily Rhythms

You live on a tiny wet ball in space, a sphere rotating on its axis in a twenty-four-hour period relative to the sun. Exposed as you are to this daily changing environment of light, temperature, and humidity, it follows that many of your organs and habits are adjusted to a twenty-four-hour schedule. However, like the thermostat in your furnace, the alarm on your clock-radio, and the control on your food freezer, they don't necessarily function simultaneously.

Your liver, soft, solid, reddish brown, and unglamorous, is one of the most important organs in your body. It performs at least 500 separate functions for you. Without it you would live only a few days at most. It has a fascinating twenty-four-hour cycle. During the day, while you are awake, it produces bile, which helps to emulsify and digest fat. At night, while you are resting, it breaks down glycogen into the glucose that you will need for energy to be your dynamic self when you awake.

Your blood pressure follows another metronome. It is at its lowest at about three in the morning; by three in the afternoon it has reached its highest reading.

During the night the vital capacity of your lungs decreases, while adrenaline, your body's activity-boosting hormone, is produced in its largest quantities between 4 and 6 A.M., just before you awake. By late evening you are producing little, if any, adrenaline.

You sleep in a twenty-four-hour rhythm, and your body temperature increases and decreases in a similar cycle. Your temperature reading will reach its peak during your waking hours and its lowest point comes while you are sleeping. As your temperature rises during the day, your efficiency increases; as it drops, so will your effectiveness. However, we are complicated and individualistic machines—not produced on any assembly line. We are different from each other in countless ways less visible than the pigment of our skin or the color of our eyes.

Some of us are "morning" people; others are "night" people. If you are a "morning" type, you will have your highest temperature early in the day and will do your best work during those hours. If you are an "evening" type—if you "hate to get up in the morning" —you will show a rising body-temperature curve during the day and your greatest period of productivity is reached at just about the time when the "morning" types are thinking about calling it a day.

If you are willing to risk creating among your fellow workers the impression that you are a hypochondriac, you can learn, within a very few weeks, whether you fall into the "morning" or "evening" category. Take your temperature, every hour, from the time you arise until you retire. If your temperature climbs as the

day progresses, you are an "evening" person; if it decreases instead, perhaps you should plan your heavier work load for the first half of each day for you are the "morning" type.

Your twenty-four-hour temperature cycle tends to resist radical modification. Experiments seeking to find the answer to why people sleep and why the rhythm of sleep is twenty-four hours long have shown that while the pattern may be forcibly changed for a short period of time to a twenty-one-hour or even twenty-seven-hour rhythm, the twenty-four-hour temperature cycle refuses to go along with any alteration in sleep habits.

The Time-Zone Syndrome

Now that we can fly around our planet in several hours, our commercial airline pilots are complaining about a new problem—time-zone fatigue. They maintain, and correctly so, that although they have crossed several time zones, their body is still functioning on their home-zone schedule, while at their place of landing everyone is living on a different schedule. The pilots want longer rest periods following lengthy transmeridian flights to give their body processes time to adjust to the new environment.

Many companies are now advising their executives not to perform any important business functions after crossing several time zones until they have rested for a day or more. Bad decisions, made under conditions of fatigue and altered body timetables, can be far more costly than an additional day or two of rest charged to the expense account. This point was dramatically made during Premier Kosygin's visit to the United States in 1967. Following his flight from Russia he refused to meet with the press or any members of the American government until he had rested for a week to allow his body "clocks" to adjust to the different time zone.

Body "Clocks": Fact or Illusion?

The scientific and medical debate as to whether all living organisms, including man, contain biological "clocks" that regulate body functions is not resolved. One group maintains that

these "clocks" (still not located, if they do exist) are strictly internal devices uninfluenced from the outside.

Another group of biologists has performed experiments that do more than hint that nature's timetables, including man's, are affected by outside forces. Prominent in this area is the research being performed by Frank A. Brown, Jr., Morrison Professor of the Biological Sciences at Northwestern University.

One of Professor Brown's early experiments, in 1957, strengthened the "outside force" hypothesis. He collected a number of oysters from the seashore at New Haven, Connecticut, and transported them nearly a thousand miles to his laboratory in Evanston, Illinois. If those who maintained that all living organisms have internal "clocks" were correct, then the oysters—living in darkness in *covered* containers of Atlantic Ocean salt water, under constant conditions of temperature—should have opened their valves in Evanston at the same time as they always had at New Haven, in synchrony with the tides on their old seashore habitat.

They did just that—for a few days. But within two weeks they were opening and closing their valves at a different time, in synchrony with the positions of the moon in Evanston! The positions of the moon always coincide with the ebb and flow of atmospheric tides everywhere in the world, but there is no ocean tide in Evanston, Illinois. Yet the oysters, still covered, were synchronizing their movements with a nonexistent ocean tide that "something" (certainly not any internal "clock") was telling them existed in their new neighborhood.

Professor Brown and his associates went further in their brilliant research. They began to experiment with a biological process common to every living thing—metabolism. Metabolism, in simplified, nonscientific terminology, is the measurement of chemical change in a living organism between the time it has been "fed" and the time it discharges the food as waste. Your physician might give you a "basal metabolism test" to discover whether or not your body is making proper use of the food it receives.

The subjects selected by Professor Brown were small pieces of potatoes with sprouting eyes. These young specimens were hermetically sealed, in constant darkness and *under constant conditions of pressure,* with proper recording apparatus to measure the

rate at which the young sprouts consumed oxygen. Brown and his associates discovered that the potato had a twenty-four-hour cycle of oxygen consumption, even under these controlled conditions, which, evidence indicated, was somehow related to a similar twenty-four-hour cycle in barometric pressure outside its sealed container. Most surprising was the potato's ability to predict the outside barometric pressure *two days in advance.* The height of its afternoon peak in metabolic rate appeared to be related to the barometric pressure of the area two days later!

As Dr. Brown sums it up: "Every living thing studied in our laboratory, from carrots to seaweeds, and from crabs to oysters to rats . . . has shown this capacity to predict very safely, beyond chance, the barometric pressure changes usually two days in advance. It is interesting to contemplate the problem of a meteorologist sealed, incommunicado, for weeks or months in constant conditions, and asked to give two-day weather predictions . . . or for that matter, even to tell you the weather today."

Just as radio waves penetrate the walls of your home to bring you the six o'clock news, "something out there" penetrated hermetically sealed containers and triggered the strange and cyclic actions of Professor Brown's potatoes. You and I, of course, are not protected within sealed containers, nor do we go about our daily lives under constant conditions of temperature, humidity, and pressure. Yet we all would like to think that we are at least as sensitive as a potato. Do we then dare conclude that the same unknown forces that act on the oyster and the potato might also affect us? Could whatever force that "triggers" them also "trigger" some sensitive mechanism within us, causing our moods to fluctuate with all the characteristics of a barometer?

Your Emotional Cycle

All of us have our emotional ups and downs. Some days we are riding the crest of elation, enthusiasm, and excitement. On those occasions we feel that there is nothing in the world that we cannot handle.

On other days we are "down in the dumps." The slightest

remark will irritate us, our appetite is terrible, and we balloon the most insignificant situation completely out of proportion. Our attitude actually seems to attract trouble during this period.

Some years ago a scientific study of these emotional fluctuations in male human beings was conducted by Professor Rex Hersey of the University of Pennsylvania. His conclusion was that although the emotional cycles of individual men vary with the individual from sixteen days to sixty-three days, the average length for men is about five weeks. This is the typical length of time it takes for a normal man to move from one period of elation down the scale to a feeling of worry (the most destructive emotion, according to Hersey) and back up again to the next period of elation.

Professor Hersey and his group devoted an entire year to the observation of a group of normal workers of various occupations, ages, personality types, and ethnic backgrounds. Their behavior in countless areas, such as efficiency, productivity, cooperativeness, verbal outbursts, ideas, absenteeism, emotion, and reverie, was studied along with their blood pressure, weight, hours of sleep, feelings of fatigue, and illnesses.

To simplify and portray the fluctuating moods of his subjects, Professor Hersey constructed a scale of emotions to which he applied numerical values. Happiness and elation received the highest value, plus 6; worry was assigned the lowest value, minus 6.

Each day for thirteen weeks the subjects were briefly interviewed four times and given a "mood rating" for that day, ranging from plus 6 to minus 6. In most cases Professor Hersey believed that the subject's own opinion of how he felt combined with the interviewer's observation resulted in a fairly objective rating. Although such a method could never fathom or portray all the different emotions of an individual, it did chart, with sufficient accuracy, the dominant mood of the day.

The major surprise to Hersey was that although different individuals had different cycle lengths, they were always fairly constant for that individual. If one worker had an average mood cycle of five weeks, it was almost never less than four weeks, almost never more than six. In spite of domestic squabbles, trouble with the boss, great pleasures, promotions, job problems, unforeseen

good luck, and accidents, this cycle *did not vary by more than one week from the normal cycle for that person.*

What are the symptoms of a high period in your emotional cycle? You bounce out of bed, hurry to work with enthusiasm, and tackle jobs that you have been putting off for days or weeks. Problems will stimulate you and no job is too difficult to tackle. You feel so great, physically, that when you return home from work you are ready for some social life. You also make plans for the future and think about that new automobile or a new house you want to buy. Financial problems almost disappear from your mind. You have what my good friend W. Clement Stone calls "a positive mental attitude."

In your low periods even going to work is an almost impossible task. Solving problems, or for that matter, any mental or physical effort, is difficult. You feel tired, depressed, and you worry about matters that you ignored during your "high" period. You become concerned about your job, your future, your family, your bank account, and your own health. You are negative in all your thinking.

Strange as it may seem, your sexual activity is probably greater during your "low" period. Since you are restless and sleep comes with difficulty, you will often engage in intercourse to quiet you and put you to sleep.

How to Forecast Your Emotional Cycle

Obviously it would be of great help to you if you knew your "high" and "low" periods—and this can be quite easily learned, with a minimum of time. Begin by preparing a simple chart similar to the one shown in Figure 5.

This is a simplified version of the graph used by Professor Hersey but it is sufficient to chart your own emotional cycle. Every evening take a few moments and review your general mood of the day. Then place a dot in the box which you believe most aptly defines your state of mind. Connect the dots with a straight line as time goes on.

Soon a pattern will emerge. This is your natural mood rhythm and in most cases it will continue. After a few months you will

		Month										
		1	2	3	4	5	6	7	8	9	10	
Elated	+3											Set up graph for 30 days
Happy	+2											
Pleasant feeling	+1											
Neutral	0											
Unpleasant feeling	-1											
Disgusted; sad	-2											
Worried; depressed	-3											

Fig. 5. A Grid for Recording Your Emotions

know, with amazing accuracy, when your next "high" is due and when you should prepare for your next "low." As I mentioned earlier, this cycle will normally not vary by more than one week either way. With this knowledge, this ability to at least partially "see into your future," you will be able to adjust your behavior to suit your mood. When you are going through your high period of elation, you will think twice before making rash promises, impossible commitments, or misguided installment purchases. You will also be able to live through your low periods of sadness and depression because you will know that these too will pass, within a few days. A greater knowledge of cycles, as you can see, will help you to change what can be changed and prepare for what cannot.

The Love Cycle

The female of our species also has an emotional cycle of approximately five weeks, but hers is complicated by two other cycles. With one, the menstrual cycle, she is quite familiar, for she has lived with it since the onset of her puberty and, except for periods of pregnancy, she is confronted with this cycle approximately every twenty-eight days. During this period, each month, especially if pain accompanies menstruation, the female is liable to varying moods of emotion.

But women have another cycle, little known to most, and first recorded in the 1930's by Dr. Marie Stopes—a fourteen-day cycle of amorousness. Dr. Stopes called her cycle "The Law of Periodicity of Recurrence of Desire in Women" (one wonders what it would be called today). After considerable research Dr. Stopes disclosed that normal women have a decided increase in their sexual desire just before menstruation begins and again eight or nine days after the cessation of the menstrual flow—a cycle of fourteen days. She also pointed out that the second increase in ardor, following the cessation of menstruation by eight or nine days, is exactly in agreement with the old Jewish plan of having twelve clear days after the beginning of menstruation before the next union should take place.

Obviously, then, if you are a woman and begin to keep your emotional chart as outlined here, there will be irregularities in its original appearance not found in the cycle of a male. Nevertheless, you will discover that in spite of these interruptions, both physical and psychological, you, too, have an emotional cycle that is approximately five weeks in length.

Why do our moods fluctuate in cycles? Professor Hersey thought that climate might be the cause but realized that there was no relationship between the cycles and climate conditions unless each person responded differently to changes in the weather, for each individual had his own cycle, which did not move up and down in the same wave as those of others.

His conclusion? He wrote, "Since there is no other single influence, besides climate, of which we have knowledge, that affects us all so equally without reference to individual conditions, one can only conclude that the basic cause of this very interesting human phenomenon is yet to be found. . . ."

Your Cycle of Creativity

Perhaps you can recall at least one instance when your memory or your ability to express yourself intelligently failed you in an interview or examination and possibly prevented you from obtaining a promotion, a big sale, or a job you wanted. You insist that if

you had a second opportunity, you wouldn't fail—and you are very possibly correct. You may have failed on that particular day because you were in your low period of creativity.

Great writers, artists, musicians, and even scientists have long felt that their best work was performed in spurts, followed by long gaps of nonproductiveness. Unless they were "in the mood," they were completely impotent, artistically speaking.

Dr. J. H. Douglas Webster, whose chief contributions to the knowledge of rhythmic fluctuations are in the field of medicine, applied his brilliant analytical mind to exploring the possibility of cycles in creativity. His comprehensive research involved not only the assembling of data from the biographies and collected works of musicians and poets, but also a thorough review of earlier papers on the subject. The most prominent cycle he discovered in creativity averaged 7.6 months in length.

Where there were daily records available through diaries and letters it was discovered that Christina Rossetti, Anne Brontë, Johann Wolfgang von Goethe, August Platen, Heinrich Schütz, and Franz Schubert had peaks of creativity approximately every 7.6 months. Where there were monthly records available the same 7.6-month high in creativity was found in Rupert Brooke, John Keats, Percy Bysshe Shelley, Thomas Gray, Victor Hugo, Wolfgang Amadeus Mozart, Nikolai Andreevich Rimski-Korsakov, Pëtr Ilich Tchaikovsky, and Jean Sibelius. A similar cycle was discovered in the productiveness of Walter Scott, Katherine Mansfield, Gustave Flaubert, Henrik Ibsen, Richard Wagner, Charles Darwin, Claude Bernard, and Michael Faraday.

A longer cycle, seven years in length, was first noted by Pythagoras and later discussed by Cicero and Seneca. Sigmund Freud believed that his best periods of productivity came every seven years.

How many truly creative people would be relieved if they realized—and learned to live with—the fact that their barren periods do not indicate that they are losing their touch but are instead only the inevitable "lows" of a cycle that will eventually take them into another "high" period of creativity? Here, indeed, is a subject fertile for further research and exploration.

Your Electrical Cycle

Remember those trees in New Haven that produced electrical voltages in regular cycles?

All matter is fundamentally electric in nature. The paper on which these words are printed, the chair on which you are resting comfortably, the bed on which you will sleep—all are composed of negatively charged electrons circling constantly around positively charged protons. Now don't let this scientific terminology frighten you away. I merely want to remind you that our Connecticut trees with their electric voltage are composed of matter—and so are you.

Along the nerve fibers of your body direct electric current flows to transmit signals from your senses to the brain. Touch a hot stove with your hand and the sense of touch in your fingers will immediately flash a message via electric current back to your brain. Another message, almost simultaneously, will flash back from your brain down the nerves of your arm telling the muscles of your arm to remove the hand, quickly, from the hot stove. The flow of this electric current, similar to that in the tree, can be measured, and over 30,000 such measurements were made by Dr. Leonard Ravitz on almost 500 students at Yale University, Duke University, and the University of Pennsylvania.

Dr. Ravitz discovered that although we are subject to many different and periodic electric tides that sweep through our bodies daily, these tides, for the most part, *occur in cycles.* He noted a cycle of twenty-four hours and others of bimonthly, quarterly, and semiannual length. Need I remind you of the semiannual, or six-month, cycle also found in the voltage output of our trees?

The Aftershock

One of the enigmas of cycle study is that individual human beings, plants, and animals have cycle lengths that are different from others in their group. Why is my emotional cycle five weeks long while yours is six weeks? Why does your "high" come at a time when I am at my "low"? Why am I a "morning" person while you do your best work in the evening?

Are there inherent differences in plants, animals, and human beings that determine their individual responsiveness to outside forces? Consider the pigments of an artist's palette. The red paint he applies to his canvas is exposed to the blue in the sunlight just as much as the blue paint, but it "elects" to respond only to the red rays of the spectrum. His blue paint is exposed to the red rays as much as the red pigment but it ignores the red rays and reflects only the blue. Could plants, animals, and human beings be similarly constituted?

The possibility of inherent differences in all of us was suggested by the work of Louis S. Goldstein, a pediatrician of Yonkers, New York, who has spent considerable time on the subject of "aftershock."

The first shock that we experience is the shock of being born. Sometime after birth, and later on after intrusions into our flesh such as operations and vaccinations, many of us experience what is known as a secondary shock or aftershock. If there are such things as "aftershock," wouldn't you expect them to happen at random and not on schedule? Dr. Goldstein's work shows that these aftershocks manifest themselves only on certain particular days. In the 214 births which he studied, although twenty-six infants had secondary shock at eight-day intervals and thirty-five infants had secondary shock at ten-day intervals, not one single infant had aftershock at nine-day intervals! Although ten other infants had aftershock at twelve-day intervals and twenty-five at fourteen-day intervals, not one infant had aftershock at eleven-day or thirteen-day intervals. It would be extraordinarily difficult to obtain such results by a random distribution of 214 cases.

Moreover, the critical days in many instances seem to have a simple arithmetical relationship. Many secondary shocks occur eight days after birth; others twenty-four days after birth. Some shocks occur seven days after birth, or fourteen days, or twenty-one days. Is it possible that someday we will be classified according to the number of days it takes each of us, individually, to echo an initial shock? Is there a hint in Dr. Goldstein's work that may someday provide the key to understanding the differences between you and me, between your cycles and mine?