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CHAPTER 4
Bodily and Environmental Conditions

So did the mind of a certain man and his body and his whole animate and inanimate environment discover the Mind-art; every science was ransacked for help towards the more skillful and effectual ways of using the mental faculties and regulating the body and environment. —ELMER GATES

The daily practice of quiescent introspection and original mentation led Elmer Gates to notice the effects of sudden and marked changes in the physical condition of his body and environment by corresponding changes in the introspective and originative results. The body is a mind organism; all its structural peculiarities and physical processes are as they are because they form a mechanism for the embodiment of mind. Every defect in the mechanical completeness, functional working, nourishment, or elimination at once disarranges the mind. Of this there was found abundant and convincing proof. Anatomical and physical normality, normal position of bodily parts and attitudes, freedom from disease, injuries, abnormalities, and faulty metabolism, were found essential to successful mentation. Insufficient

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rest produced fatigue, which is wholly unfavorable and, he observed, is a mental state pure and simple: the mind, not the body, can get tired. Pain as a mental state distracts the attention, but its bodily effect is more hindering, as is also lack of nourishment. Experiment proved that underfeeding or prolonged restriction to one article of diet was a handicap; good mentation required thorough but not excessive nourishment.

Gates was eager to know if objective conditions could actually influence his mental processes despite his efforts to the contrary. By objective conditions he meant everything except the conscious and subconscious mind. "The environment of any object," in his words, "is all of the universe except itself. The Cosmos consists of any one thing plus all other things. Other than you and your environment there is nothing else. In one sense it is convenient to think of the anatomical organism of a living creature as part of its mind's environment. To this the mind sustains a most close and causal relation, *but not more close* than *is* the *relation* of the *whole living organism* (body and mind) *to its environment*. They are

composed of the same kinds of substances and energy; both are subject to the same physical, chemical, biological, and mathematical laws; there is mind in the creature and there is mind of the same kind in that which is outside; in its environment the creature, in the most literal sense, not only lives and moves but also has its *being*. Your being is not exclusively in yourself, but to an even greater extent is in the Cosmos of which you are a portion. Every second of conscious life is for still other reasons dependent on the momentary intactness of your connection with your environment."

Environmental conditions affect the quantity and quality of mentative work of the creative or acquisitive kind to such a degree that anyone regularly and systematically devoted to any line of work can easily notice it. There are many conditions other than the common ones that modify mental processes, and even though by natural effort some can be partially overcome, it takes energy. Gates made a preliminary study of each condition

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of environment that undergoes daily or seasonal variation; also the effects of localities, altitudes, geographical features (prairies, deserts, woods, mountains, oceans). The method consisted in making a full record of bodily and environmental conditions during which his mind actually ascertained and discovered new knowledge and did original and creative work. There were those who claimed such a high degree of occult powers and personal attainments as to be free from the effect of their surroundings, but psycho-physical measurements and experimental evidence obtained by his study of some of these claimants did not warrant such assumptions.

A laboratory study of artificially regulated environmental conditions disclosed to Gates the intimate nature of his connection with the environment. The first requisite was an environment that could be uniformly maintained and regulated so that one factor at a time could be varied. It was for this reason that he built the Insulated Isolation Chamber. He found that there was an optimum value of any factor for the best mentative work; fatigue set in sooner at other values. Such factors as temperature, barometric pressure, humidity, oxygen content of the air, electrostatic potential, minute amounts of carbon dioxide or other gases or vapors or smells, illumination, and noise level were studied. Frequent fluctuation of any one wasted vital energy.

His methods of determining fatigue were such as the following: The arm lifted a given weight to a given height at a certain rate, keeping time with a pendulum; or the mind passed understandingly through consciousness the propositions and corollaries of plane

and solid and spherical geometry at a given number per hour, previously regulated by trials. These or similar kinds of motor or mental work were continued until fatigue commenced. After an average was obtained for a uniform environment that was as nearly normal as he could make it, one factor was then varied as the same tasks, were repeated, and the effect noted on the fatigue point and other bodily and mental conditions, including quantity of work, time required for

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recuperation, effect on excretions. Mentation, he found, was not only merely relieved of hindrances, but also was actually promoted and augmented by proper environmental conditions.

Having arrived at these conclusions, he made another investigation, repeating his experiments and adding new ones. He more carefully and minutely observed changes in his introspection of each mental function and state when there were sudden changes in his body, such as from ample sleep to great loss of sleep, rest to fatigue, recumbent to standing position, muscular relaxation to severe strain, different attitudes and gestures, fasting to full nourishment and to a limited diet; also the effect of changes in environment, as from great cold to warmth, humidity to dryness, high to low altitudes, stillness to great noise.

Every sufficiently sudden change produced marked changes in his introspective states. He could with some certainty predict what modification in qualities, intensities, products, and speeds of conscious processes resulted from given changes, and this led to an experimental study of the introspectively observable effects of artificially produced changes. He was led to believe, what he was later able to prove, that all the slower and smaller changes in body and environment also produced changes in his mental states and processes, but that these effects were too gradual or faint to be noticed except in their cumulative action. This led him to make a more definite quantitive study of conditions that produced introspective effects.

He noticed that during certain days and hours he could perform intellectual labors more easily and do better and more original work than during other hours. To determine to what extent this was caused by changes in body and environment, he measured and recorded many changes (some of which were given later on in lectures and reported in the press), not only in the environment but in the body, as diet, breathing, perspiration, and chemical composition of excretions and secretions. He paid particular attention to times when he had new ideas and was otherwise mentally above par, and found that generally they corresponded with definite conditions of body and environment.

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Only generally was this true, however: he later discovered that these apparent exceptions existed because proper introspective attention (the "dirigation" of Chapter 7) more than compensated for unfavorable conditions; but it required a much greater expenditure of energy.

He made quite a specialty of this line of research on the originative and creative capacities—another outlet for that "lightning activity" which astonished his uncle. He would select some subject in the sciences or arts and apply his mind to it exclusively for several weeks or months, keeping a minutely accurate record of times and character of every noticeable change. At regular daily periods he would introspect his mental content of that subject, considering each fact in relation to every other in the same and other subjects, trying to invent by considering defects of existing methods and apparatus, turning the problem over to the subconscious, trying it in various bodily and environmental conditions, and by every conceivable introspective conscious and subconscious method; and when failure or success took place he made a complete record of conditions.

In his investigations Gates inevitably noticed time lost by interruptions. Assistants tabulated for several months the time lost from his daily work by all interruptions, by a given and gradually increasing number of prearranged ones, and the work done when there were no interruptions. A sufficient number decreased the work output to almost nothing, the output increasing as the interruptions decreased. Another loss of time was in doing things just as well done by an assistant.

Observations upon himself and many others revealed to his surprise that it was not unusual for interruptions to waste a half to two hours daily-estimated as 180-730 hours annually, or 36-146 working days of five hours. In an active life of 50 years, this loss of 5-20 years could be enough to change a lifework from great success to partial success or even to failure.

The mental working day was estimated at five hours because numerous observations upon himself and many others showed that the mind could not do continuously, month to month,

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first-class productive, originative, or creative work for much longer, and then only when health and strength were at their highest and no energy was used for other kinds of work. One could indeed keep busy ten to sixteen hours daily at any routine drudgery, but the mind was no longer at its best after the first three to six hours.

More serious than quantity was the loss in quality. It was only by continuity of attention for several hours that the highest degree of daily functional efficiency was attained. Momentary attention to other matters set up activities in other parts of the brain, and there was not that cumulatively increasing attentional stimulation of cerebration that occurred with no distractions. About these facts his experiments left no doubt at all. Distractions lowered the functional excitement, or "frenzy," of the creative imagination and upset the "spell," or "ecstasy," that after a short while tended to new insights and ideas. Distraction is so serious to creative mental activity that the mind instinctively becomes so absorbed in its subject and absent-minded about everything else that it does not notice ordinary disturbances.

No feature of the mind's functioning so impressed Gates with its practical importance as that the mind had to get worked up to a certain enthusiasm and alertness where abilities were highest. It took time and great effort and strong incentive to bring about this "Mentative maximum"; it used energy, and rest and recuperation must follow before trying again. He could not, for instance, without great effort get the mind thus worked up more than once a day, and even with the very greatest effort it could not be done with equal success every day. Generally several days' rest was required. By systematic practice, however, a comparatively uniform series of results could be attained, provided the attention was not disturbed.

The attention could be kept in efficient operation only a few hours at a time. During the five hours' daily mental work there was only a short period of maximum activity under the strongest and brightest limelight of attention, perhaps ten to forty minutes. This short period was the culminating opportunity of that day's

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work. Many experiments upon himself and others convincingly substantiated this conclusion. This experiment was also made upon persons kept in ignorance that the disturbances were made one day and not another, thus eliminating suggestion, and it was made in an environment that was uniform day after day.

If this highest mental maximum was not reached, then the most evanescent and higher generalizations, the more subtle distinctions and more beautiful conceptions, were not attained, but instead a lesser series of results to start the next day's work. "Ofttimes an idea is born with difficulty," Gates wrote; "it evades us time and again until finally, dimly and for a brief period, we realize that the insight is about to enter consciousness. It may not—and often does not—and may even remain unknown that day or that generation." It is well established, he continued, that in any process of

physiological or psychological deterioration it is the very highest faculties that first disappear; those mental capacities that have been attained last in the course of evolution are first to be destroyed when a degenerative process sets in. Now, fatigue is such a process, and everything that prevents continuity of attention is a retrogression, and the very highest faculties are first affected.

In one sense Gates considered a person a mentating organism, or mind-machine, whose output in ideas or creative work can be augmented 10 to 40 percent. In a whole lifetime there are comparatively few years when this machine is at its best; so its working time should be economized. In early life, or when engaging in a new work, the mind has naturally a shorter daily period of effective mentation, but as one grows older or becomes inured to a given work, the mind is capable of longer hours and should gradually be accustomed to them. From his observations a man is fortunate if the exigencies and changes of an active life permit twenty, to say nothing of fifty, years' continuous application to mental work. Ordinarily, he found, two or three periods of one to four years each were accomplished—not quite enough for complete preparation and adequate skill. A greater number of persons, he believed, for the world's sake should take up lines

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of research and give their lives to them, and should value their time too much to allow it to be wasted by such hindrances so easily avoided.

From his point of view the place in which Gates worked (he once named it the phrontisterion!— Greek for "think-shop") was not merely the small space within his laboratory walls or studio, it was unlimited space filled with worlds; the Cosmos itself was his think-shop. Although he could not change the Cosmos, he could make himself more freely subject to its influences.

His personal attitude toward his environment was a much closer relation than even his studies indicated. "When I once fully realized," he expressed it, "the causal and functional relation between my body and environment, and between my mind and environment, saw that this relation is both immanent and corporeal, and that my environment was much more than my immediate surroundings, I was profoundly impressed—my emotional exaltation was almost unbearable. When I realized that the vast objective Cosmos and the equally vast immanent forces (animate and inanimate) were all parts of a whole by means of which my mind was functioning, I was over-whelmed with my littleness and elated with the greatness as being part of that Whole, with the power to use it and be used by it! It was during these

moments that I most clearly saw that only by and through mind could I know anything and take advantage of these relationships. All this existential Cosmos would be an insensate, dead, and unmeaning thing but for mind. Therefore the study of mind and especially of those processes by which new truth is discovered, has been taken up with an increased interest and enthusiasm that cannot be described, 'determined to cease not till I die,' and fervently hoping that I might never die so I might continue my studies into the Beyond."

The three factors are interrelated in a vital way. The body would not be a living body except for the mind; the mind would not function but for its body; and neither could exist even for an instant without the environment-the body would not grow, the mind could not get memories. There is no machine

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so closely interactional as this body-mind machine. "Think of it!" he exclaimed . "Not only do these three factors constitute a mechanism in the fullest sense, but the environment enters shapingly into the mind by furnishing its sensations, images, concepts, and ideas of objects, and the mind reacts upon its environment, modifying it. The mind is intrinsic in the living body, constituting its life and building it. These three factors mutually influence each other—not merely a mechanism but a living mechanism—a mind-mechanism; a self-active, mind-making mechanism which is guided by the mind it makes, and in turn the mind organizes the mechanism."

"It would not be a true psychologic account of this period," he wrote, "without saying that this was a time of almost constant yearning or 'desire-prayer' for enlightenment—an asking of the Whole for illumination; a wondering why I could remain in ignorance of the real nature of mind when Mind is in the universe! Hour by hour I held in my mind the feeling *that inasmuch as there is that in the Cosmos* which is conscious, why cannot my consciousness get in touch with it? In a dim way I began to look upon Consciousness as the very inmost secret of the mind and of all life, and as the most significant factor of Existence. I did not clearly state or think this but felt it all the more intensely. I distinctly was aware of *all that other Consciousness* in the *Cosmos* and seemed to *feel* it, although I well knew it might be an illusion or misinterpretation—but of my awareness of it there is no doubt. I conceived the universe as being the infinite body of an infinite mind-activity, the key to which is Consciousness, and therefore I believed that a knowledge of the laws of conscious mind would be the most important attainment possible. To this consciousness-activity in the Cosmos, conceived as a cosmic and immanent

activity, I yearned my daily and hourly desire-prayers for enlightenment."

That perhaps he lacked enough ability to accomplish his ambitious purposes was sometimes a discouraging thought, but he hoped the art of mentation would make up for any deficiencies. So eager to possess ability, like some of the great discoverers, he

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resolved at least to do nothing to weaken his health. This led him to put into practice the results of his experiments; and to further that end he studied physiology and hygiene, and took up the study of medicine under a preceptor, with elective courses in college.

This study of his relation to his environment exerted a deep influence upon subsequent investigations. He realized that for the best results in the study of the sciences and arts he must not lose sight that the mind is not independent of the body, environment, moods, idiosyncrasies, habits, morals, evolutionary degree of growth, and other influences. Proper adjustment must be maintained between body, mind, and environment. "The mind responds to changes in environment and is therefore functionally part of it; changing conditions are as cosmic as metabolism or chemicals. The mind cannot be understood as an activity independent of the Cosmos. This strange view of the isolated independence of the mind functions has dominated all thought of the world," he emphasized.

Gates marveled that a human mind could proceed into the unknown, explore it, and make ever greater and greater parts become known. "How is it possible that a human mind shall come to know what no other human mind can tell it, what no book has recorded, what no language has expressed, what no mind has conceived?" he pondered. "How can it wrest a new idea out of the Unknown? Now came into Newton's mind the idea of gravity and the calculus? into Spencer's, Darwin's, Haekkel's, and Wallace's that of natural selection and survival of the fittest? Although I did not then dearly understand my own conception or insight into the mystery, I had a slowly forming conviction that the MIND which I called *my* own is in reality but a functional portion of a universal process, part of a cosmical activity—a little twig on the great tree of life; and that inheriting its nature and responding to its influences, my mind is a practical portion of a Universe-process, is a vortex in the Infinite Sea of Consciousness; and in discovering the new truth I am but taking advantage of my interactional, organic connection with the

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mentative process of the Cosmos. Not in any mystical or supernatural manner but in a way just as natural as when I utilize the waterfall to turn the mill, or the sunlight to aid in growing crops.

"There is in the Universe, THAT Out of which my consciousness comes and by which it acts; there is THAT which if it were not, my consciousness could not be. I know not what THAT is—but my consciousness is dependent on it . . . is part of it—and it is THAT which constitutes those mental processes by which truth is discovered," is what he wrote at that time.

Later and much more extensive experience in making discoveries and inventions fully demonstrated the correctness of his early insight that new ideas are the result, not of supernatural or mystical agencies but "of the natural processes of consciousness and powers of the mind as experienced in the mind in functional interaction with Cosmos."

This study of environment naturally led him into an awareness of functional periodicities. Some of the main results of his study of them, which he put into practice to the best of his ability, are summarized perhaps in his general view: "No one physical aspect of nature is more noteworthy than the recurrent periodical or rhythmical character of its phenomena and this is probably true throughout the whole domain of Cosmos from its largest macrocosmic groups of sidereal systems down to its smallest infinitesimals; from movements that recur every billions of years to those that take place billions of times per second; from the recurrent ages-long geologic periods to the annual seasons, to night and day, to the rhythm of respiration, heartbeats, and light waves. Within this vast domain of infinite room there occurs forever the great Drama of The Cosmic Process whose separate acts and scenes are marked off by larger and smaller periodicities. Herein the universe undergoes its perpetual transformations and redistributions of matter, motion, and mind. This limitless ROOM is the home, the dwelling place, of boundless Totality; within this Space there are aggregated all Things into one reciprocally functioning Cosmic Whole; they are all

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composed of the same fundamental matter and motion and mind; materially, dynamically, and psychologically they are alike; they are tied together by various forces and interactions and functionally connected so that no one Thing is independent of all other Things but are inextricably related and interdependent, making ONE, FUNCTIONAL WHOLE, whose rhythmical interactions are functional periodicities. Within the larger Whole

is our solar system with our Earth keeping step in the rhythmic Goings-on, and on Earth is the evolving Organic Life. Our earth has had its succession of geologic ages with their alternate periods; and in any age its seasonal alternation of winter and summer, its daily alternations of day and night and tides; and so on in a hundred ways, each species of thing and each thing functions rhythmically, keeping its time and place with other things in that same system."

The human organism has its growth periods, with ontogenetic lines of functional development and in each line a sequence of functional crises. There are periodic, or rhythmical, sequences of functions and periodicities in all organic life, and if some are known others can be determined. To conform to them is to be doing that which nature is doing at the same time, thereby having the Cosmos for a partner and guide. When periodicities occur in any organ or person or world, then is the time for that kind of functioning easily and naturally, because that kind is then and there the trend of events for that thing and for the Cosmos of which it is a functional part. To determine the times of the beginnings of natural functional periodicities and conform to them is to float upon the cosmic tides and not battle uselessly against them. Particular kinds of bodily and mental work should be performed at certain ontogenetic periods and seasons, so as to take advantage of the great physiologic, physical, and psychologic tendencies of these periodicities.

When a function or faculty first becomes ontogenetically active, then, as pedagogy teaches, is when it should first be trained. When some other faculty begins its periodicity, all other matters should be temporarily dropped and the new functioning

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given opportunity for uninterruptedly starting its development and growth, Gates' experiments showed. To attempt to train or use an activity before the time of its functioning is time worse than wasted; to wait until after the period of activity is just as wasteful. In forming habits of work one should conform to the ontogenetic life periods when that kind of work is due, and it should not be skipped. The work should of course relate to one's predilections and genius-capacities.

A knowledge of periodicities enables a prognosis to be made, and Gates' studies suggested an art of prognosis. Briefly stated, from any one series of changes within a known normal organism all other series of changes can be foreknown. It is a natural province of science to predict or forecast events. The astronomer predicts for hundreds of years with incomparable accuracy; the farmer predicts that spring will come again; the dog, that if it

whines properly its master will open the door. The majority of intelligent actions of living creatures are based on prediction. If we know the orderly sequence of periodicities, both in the organism and in its environment, and have the chronological date at which the organism starts its life, certain computations can be made with reasonable accuracy and its important crises predicted. If the laws of physics are known, many thousands of predictions can be made for certain circumstances; for instance, if metal is heated it will expand. If the laws of physiology and psychology are known, predictions under many conditions can be made. To know is to foretell. Prognosis is not divination or prophecy; we foretell that the sun will rise tomorrow.

A functional line of development may be accelerated, retarded, or modified. Mind and truth enable us to foreknow. Prognosis is foreseeing future conditions. All adaptations of acts to ends, all voluntary actions, therefore, are based on prognosis. Whatever is to occur to-morrow exists in the makeup and functional structure of the present. There are not only these lines of development of each functional activity within an organism but also the relations of lines of activity to sequences in the world of which it is a part. Man is a unit in a Cosmic Whole, but more

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directly a component of earth and subject to its periodicities. "A functional line of development may be modified by education, social influences, beliefs and affiliations, occupations, and by hypnotic suggestion. All false teaching—all wrong emotions, all immoral conduct—pervert the normal sequences of development and make them lack conformity to the cosmic order of sequences. Truth alone leads to conformity to the Universe. In the end, truth is always the best guide, and justice the best policy."

Evolution takes place by different methods whereby the organism and the environment become mutually adapted through two initiating causes: physical reaction on the organism and mind, and mental reaction on the organism and environment. For a given development there is a special course through which the organism must pass and which no other influence can change. All things are functionally related to the whole and are cooperatively connected; therefore, to change any set of motions in nature is, sooner or later, to effect changes in everything. A growth, whether a crystal, a plant, or a reputation, is the outcome of multitudinous influences (each of which is the sum of many smaller good influences). Success is a function of the organism, locality, time, and other factors. A person, being a functional part of the larger organism, and of the social life around him, may occasionally become

conscious of the trend of events—a condition of prevision, or perhaps intuition.