

Weather and Fate

An Analysis of the Reactions of Dr. Angle†

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THE topic that I have selected for discussion, namely, the relation of weather to the individual, is one that might seem quite remote from the direct field of activity of the orthodontist. But after all, the orthodontist is a human being and so are his patients. He must adjust to the environmental impacts and pressures just as surely as the teeth of his patients react to the stress and strain that his instruments produce. However, we never think of weather in quite the same way; in the first place because we take the air for granted; in the second because we do not see the effects immediately, we only feel them. And as long as we are well we do not even feel them very much, because automatic man adjusts so well that we need give little conscious attention to the ever new situations that weather creates for us.

To make the story simple I shall have it revolve about Dr. Angle and present for you a few of the more important episodes in his life and examine them from the point of view of the environment of the time. Dr. Angle was an unusual individual and in many ways may be regarded as a genius. He was mentally alert, curious, inquisitive, and decidedly inventive—with inspirational “hunches” that might suddenly come to him on sleepless nights after he had been turning over a problem for some months. He was a slender individual, and all of his life he had been a ready victim of respiratory infections.

He was persistent and tenacious, shrewd, and willing to overcome tremendous odds; he was exquisitely sensitive to the outside world, to psychic trauma such as public or private criticism, to emotional disturbances, and to weather. While considered a recluse, he could at times be a hilarious cut-up; he might be considered moody and aloof and even vindictive, but also covertly penitent. In other words, he was an unpredictable person, “many minded and many sided” as Herndon once described Abraham Lincoln.

Because of his devotion to orthodontia the modern psychiatrist might have labeled him as suffering from a “compulsion neurosis,” but he had the good fortune of living his life remote from psychiatrists and psychoanalysts, lived it in his own way and at his own pleasure, to the great benefit of the practice of orthodontia. This able individual who could work so hard, was presumably as labile biochemically as he was mentally. The mere prospect of addressing a meeting would nauseate him¹; if he met with an unfavorable reception he

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1. I am indebted both to Dr. Brodie and to Mrs. Angle for their courtesy in supplying me with the essential dates involved.

might be sick for days. The excitement associated with a fire at his home in Connecticut produced a prolonged illness. Doctors would have labeled him neurotic, but as far as I can judge, he avoided doctors with fair success, despite the physical handicaps that we shall discuss.

How and when do individuals of this type originate? Why the neurosis?

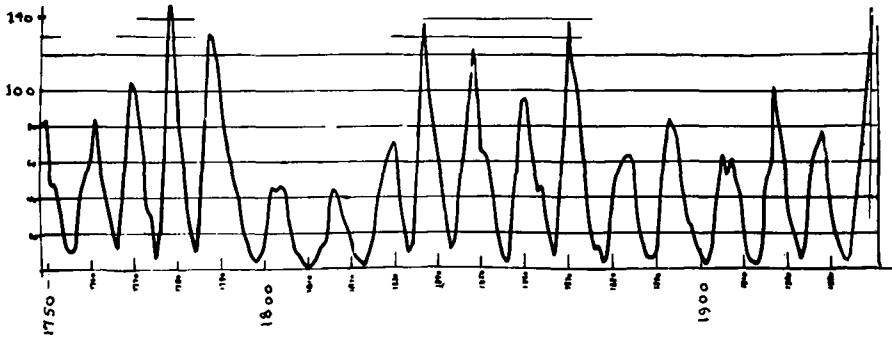


Fig. 1.—The Sun Spot Cycles as recorded by the Zurich Laboratory since 1750. Note the increased number of sun spots in the period at the end of the 18th century, i.e., the period culminating with the French Revolution and the Napoleonic Wars; the increase in the middle of the last century corresponding to the Revolutionary period and the subsequent European nationalization and the present crest.

What makes them mentally alert? What drives them? What kills them? It must be evident even to the layman that the hard living of the northern hemisphere has produced more of the able, the unusual individuals in the world's history of progress. As far back as Hippocrates this was recognized in his remarkable "Airs, Waters, Places."

"But where the land is bare, waterless, rough, oppressed by winter's storms and burnt by the sun, there you will see men who are hard, lean, well-articulated, well-braced, and hairy; such natures will be found energetic, vigilant, stubborn, and independent in character and in temper, wild rather than tame, of more than average sharpness and intelligence in the arts, and in war of more than average courage." (Para. 24.)

From this introduction we might surmise that a study of the relation of the inorganic world to the organic, finding expression in the life of Dr. Angle, might yield some interesting observations :

Born in 1855 in Pennsylvania, it will be recalled that he had as a youth absorbed what in the early days might, with justice, have been designated the dental "trade."

The Early Infection

(1) It was in the spring of the year 1881 that he developed a severe pleural pneumonia, so severe that recovery was precarious and long drawn out.

The process may have been tuberculous, it may have involved merely a series of pleural effusions and adhesions, or may have been followed by bronchiectasis. Throughout his later life he suffered from the effects set up by this pulmonary condition and he was unusually susceptible to colds and to bronchitis, and was readily fatigued. In popular parlance he had but "one lung"; the ventilating area had been reduced because of adhesions. So he was destined to live his life on a close margin of oxygen adequacy, often obvious to the degree of a mild stage of anoxemia.

I would have the reader note the *spring* onset of his acute disease and note that the year was 1881, and finally the *life-long chronic illness*. These all were of significance in the rôle of what we call fate.

In the autumn of 1881 he set out from Pennsylvania to Minnesota with the hope of speeding his recovery. Minnesota was considered fine for the tuberculous. Then, as now, we doctors often sent people away, sometimes to get them out of sight.

Angle recovered—became a "tough" pioneer; and with that acquired the pioneer urge to become a millionaire. The allure of Montana sheep raising sent him temporarily back to Pennsylvania to urge young business friends to join him and quite a group risked their small fortunes in a gamble with Lady Luck. Fortunately or unfortunately, Lady Luck frowned and said "no," for in that next winter mountains of snow covered the Montana grazing range; the sheep all died, and with that, the fortunes dwindled. The disillusioned group drifted back to Pennsylvania except for Angle, who returned to Minneapolis to take up his dental work. Keep in mind the severe winter of 1882.

Then followed the Minneapolis period during which time his interest in orthodontia developed, while he made his living doing the routine of dentistry.

Restlessness

(2) Suddenly in 1892 he announced his resolution to give up dentistry and devote himself solely to the new specialty; he sold his dental equipment, burned his bridges, as he said. In 1894 he removed to St. Louis, Missouri. Note the years, 1892-1894.

(3) Now came the development of his work in St. Louis—its successful establishment, the financial reward. Then again a sudden urge. This time, at 53 years of age, the resolve to retire. Note the year! It was 1908.

(4) But he did not retire. He went East to preach and teach, to convert the brethren, to attack. Though he did not practice his art, he labored harder than ever. This was the New London period. Again came a suddenly expressed impulse; again the notice that he would retire. Note that it was the year 1917. This time he really moved to California. The stimulated, restless, tired brain would still make new combinations of old experiences, would invent, turn up new facets, turn to new fields, explore basic interests in anthropology, in the natural sciences, or delve into the lore of the ancients. Or again teach and always give battle.

Death

(5) But finally wear and tear did show. By 1925 we have the beginning of cardiac difficulty and then one summer day, the 11th of August in 1930, the heart ceased beating.

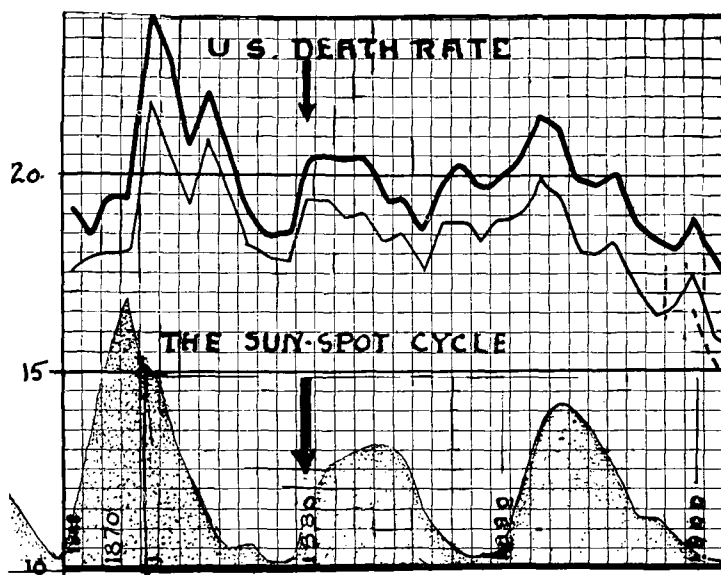


Fig. 2.—The year 1880 (arrow). Upper curve—the United States Death Rate; lower curve—three sun spot cycles since 1868 to 1900.

Dr. Angle became ill in the spring of 1880. Note the coincident increase in the United States Death Rate and the coincident change from low to great sun spot activity. The following winters were associated with heavy snowfall on the western ranges.

expression of fatigue or merely of restlessness? The two are closely related. Why the repetition of the situation in 1917? What the mechanisms of the final breakdown that began in 1925 and of death that occurred in 1930? Can we take "fate" apart, examine some of the component parts?

The Sun Spot Cycle

First we turn to the sun spot cycle. Long before our Christian era Chinese observers noted that at certain periods "spots" could be observed with the unaided eye on the surface of the sun. Johannes Fabricius, a young Fresian astronomer recorded them in 1610 and since 1750 sun spots have been systematically observed at the Zurich Observatory. I reproduce here the graph of the cycles as so recorded. (T. F. I.)

They are of importance to us because, in a general way, climatic cycles correspond to sun spot periodicity. For the last hundred years increasing sun spot activity has been associated with climatic periods that are colder and wetter. For the human being, living on the surface of the earth, that means greater biological strain because it involves the use of more energy, primarily to keep warm, secondarily to make adaptation to a more variable environment. Because of the greater energy demand, (1) more people become ill, (2) more people die, (3) more people become mentally disturbed and restless, and (4) groups and nations become restless (revolutions, wars, etc.). In this effect on the human race many environmental factors participate and the mechanisms involved may be partially socio-economic, political, psychological, or medical. Koeppen first discussed this association in 1876 and predicted the present era of upheaval, in particular the revolution of 1917. Recently, as an old man, he wrote that "it is queer that we humans, presumably created in the image of God, should behave like utter fools when sun spots appear in greater number on the surface of the sun."²

All of which we can brush aside to examine the second graph. On this graph the year 1880 is indicated by a downturned arrow over the curve of the United States Death Rate and the sun spot curve below. (T. F. 2.) Note that three sun spot cycles occur during that period from 1868 to 1900 and with that there was a corresponding increase in the death rate for the whole United States. Note that in the year 1880, when Angle became ill, the population at large had participated, more died; and the sun spot activity increased sharply from a preceding low.

And with this keep in mind that the heavy snow in Montana and the financial loss entailed to the adventurous Angle and his associates was related to this climatic cycle. Lady Luck frowned. But Lady Luck had smiled from the period 1875 to 1880. Lady Luck took her cue from the sun spot cycle, but unfortunately Dr. Angle knew nothing about it.

The Lowered Resistance of the Spring

Dr. Angle had become ill in the *spring*. We query why spring should be the period of greatest morbidity and mortality and why more individuals become insane or commit suicide, why more wars start in the springtime?

Speaking generally, we can assume that the winter has exhausted our reserves, whether mineral or vitamins or fat or carbohydrate, but we will not be satisfied with generalities, so I shall reproduce a graph of a day by day study of a female, observed for a period from December 23rd to the middle of May. (T. F. 3.)

Notice from the graph the period of lowest blood pressure and body temperature, together with highest pulse rate in the period between the middle of March and the middle of April. Note the relative acidosis (curve 11), the poor oxidation of the skin (methylene blue reaction, curve 2), the low K/Ca ratio (curve 12) and the increasing irritability of tissue response to cantharides

2. The sun spot is a vortex or area of turbulence in the incandescent gases of the sun, possibly due to hydrogen.

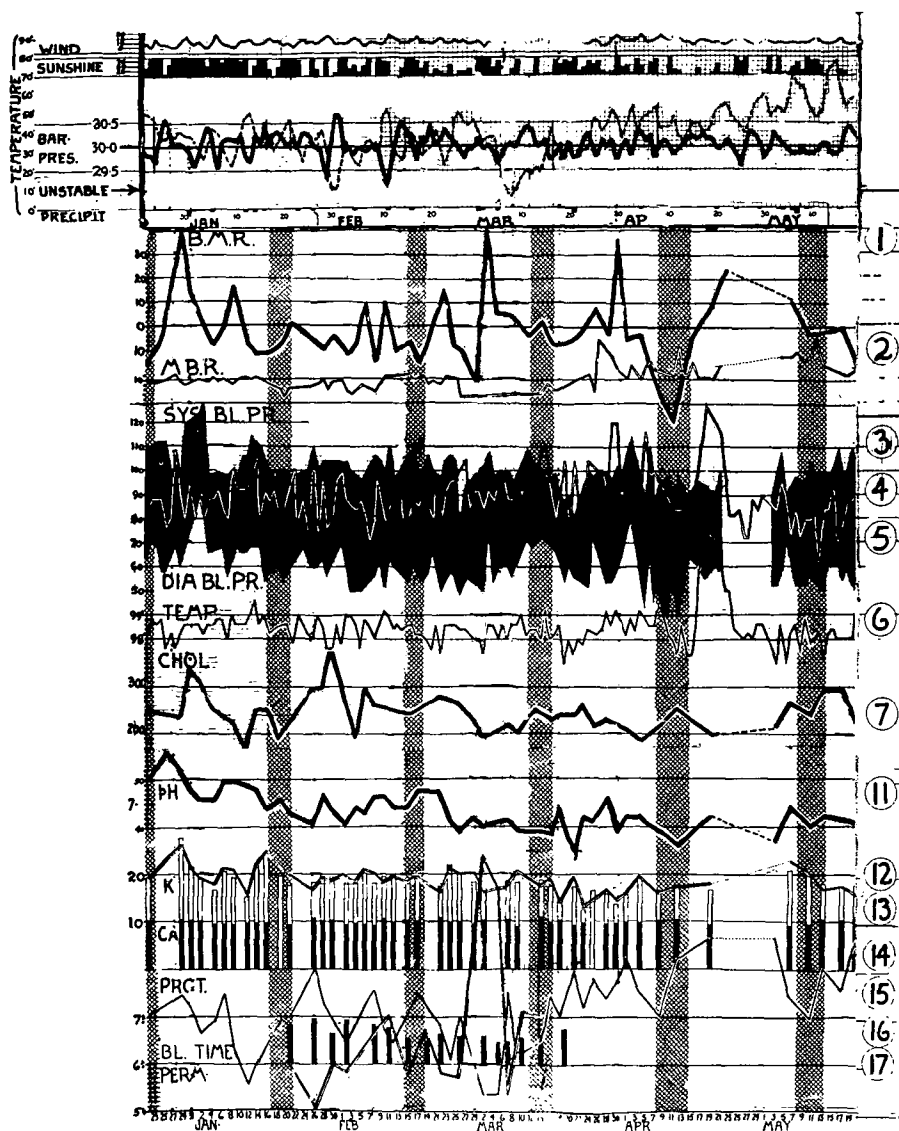


Fig. 3.—A Meteorobiogram presenting a running survey of the Weather for Chicago (the topmost group of curves). Below, curve 1-7 and 11-17 illustrate the observations made on a woman during the changes between the middle of March and the middle of April. At this time body temperatures and blood pressures are lower, pulse rate higher, there is a relative anoxia evident in the skin, the blood pH, K/Ca ratio has decreased, tissue irritability is accentuated and resistance to infection is lowest. The entire picture changes with the transition to warmer weather. (Graph from Volume III, *The Patient and the Weather*, by Wm. F. Petersen and M. E. Milliken.)

(curve 17). This latter reaction is of considerable interest. Determinations are made by putting on a cantharides plaster and observing the blister time, which in this instance decreased from a normal of about 12 hours so that by the middle of March it had been reduced to approximately 6 hours. After this time, blister tests of this sort had to be discontinued because the cantharides *produced an ulcer* instead of a blister.

In this biological phase bacteria can penetrate more readily, and bacteria that have penetrated can invade more readily. Tissue reactions indicate greater irritability and less resistance, which, as far as the patient is concerned, means that symptoms are more pronounced. It is in the spring that chronic diseases which have been relatively quiescent commonly flare up. The most obvious examples of this sort occur in tuberculosis. When we examine the meteorogram of our large graph, it will be observed that the maximal spring effect followed an unusual cold wave, which swept temperatures down to zero just before the 10th of March.

We can do more than surmise. We can very definitely say that with greater weather disturbance when the sun spots begin to increase, climaxing in the spring, Dr. Angle's resistance, like that of a vast number of individuals in the United States, at that time was lowered, and he became more susceptible³ to an infection.

Dr. Angle's Restlessness and the Sun Spot Cycle

Now we turn to the sun spot cycle. Text Figure No. 4 shows the relative sun spot periodicity and six episodes have been numbered that relate to Dr. Angle.

- (1) The birth year.
- (2) His critical illness and the Montana adventure.
- (3) The resolve to specialize and removal to St. Louis.
- (4) The first retirement and removal to New London.
- (5) The second retirement and removal to California.
- (6) The beginning of his heart disease and death in 1930.

All we have to do is inspect the relationship. Periods of greater environmental strain with increased sun spot activity were evidently followed by a feeling of greater fatigue or restlessness in this very labile individual for we immediately see that episodes 2, 3, 4, 5 and 6 all occur in definite periodicity that corresponds to increasing sun spot activity.

3. We are more susceptible to environmental strain when we are young, when we are ill, and when we are old. Actually the period when environmental effects are most significant for us as individuals, is the time either immediately before or shortly after conception. It is at that time when the condition of the mother modifies to a large extent the normal genetic development of the embryo. In other words, either the period before fertilization of the ovum or during the earliest stages of its development. Then the relative biological status of the mother modified by all the factors of the environment, but including emotions, diet, and particularly meteorological environment, can modify the genetic trends and bring about either dominance or recession; very likely the metabolic gradient of the time can modify the sex, can modify general metabolic trends and possibly even modify specific characters.

Death

And now finally the phenomenon of death. Dr. Angle's heart affection did not become noticeable until he reached the seventies and thereafter gave him more or less concern. He had two rather severe attacks (not dated) before the terminal episode. Death finally occurred on August 11, 1930.

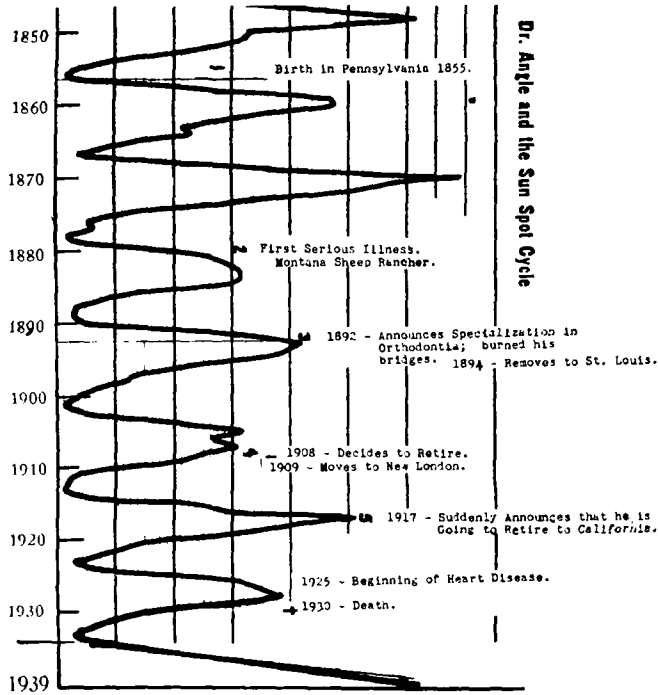


Fig. 4.—The Sun Spot Cycle from 1845 to 1940. Six episodes discussed in the paper are indicated by numbers. Note the general association of numbers 2, 3, 4, 5 and 6 with increased sun spot activity.

We turn to the meteorogram for Los Angeles for the time and observe that the temperatures had been high on the 1st of the month, while barometric pressures were relatively low. Then followed a continued lowering of environmental temperatures until the 8th of August. Two barometric crests were reached, one on the 5th, one on the 11th. T. F. 5.

When temperatures fall and barometric pressure increases (a characteristic air-mass effect) the human organism adjusts by closing down the peripheral vascular bed and this includes the skin, the vessels to the special sense organs (teeth included!), the subcutaneous tissues, the mucous membranes, the cortex of the brain, the kidney, etc. Systolic and diastolic blood pressures then increase. That increase in the blood pressure means more work for the

heart muscle. If it is at the upper margin of its functional capacity, this added strain may be too great. Then dilatation, either in its acute or chronic form, may follow. In the situation here depicted two such episodes occur. Greater energy was required on the 4th and 5th of the month, and finally on the 11th a crest was reached. The cardiac muscle of our subject proved inadequate to an environmental demand and death then followed.

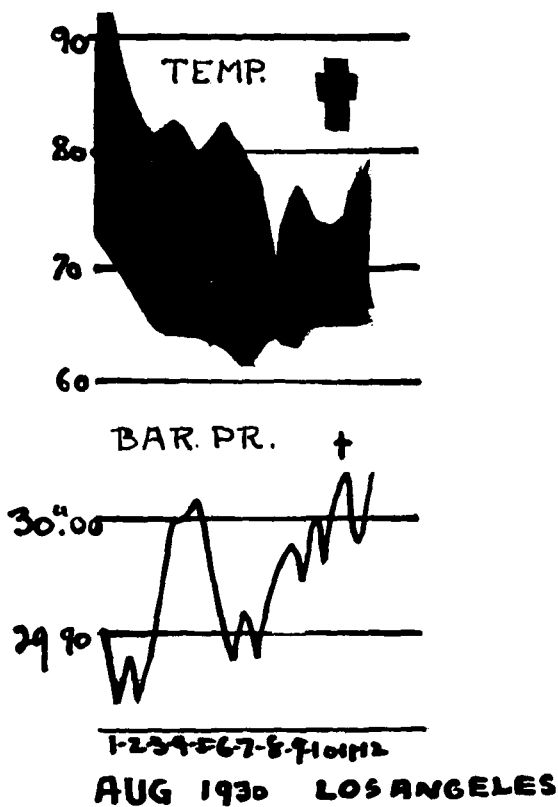


Fig. 5.—Los Angeles Meteorograph for August, 1930. Maximal and minimal temperatures of the day are indicated in the upper curve, barometric pressure in the lower curve.

In the final analysis, life and death can best be expressed as energy concepts. Life can go on as long as adequate energy is supplied to enable the organism to adjust to all environmental situations, no matter of what nature, whether simple or complex. When once, because of congenital defect, because of disease, or trauma, or ageing, the organism can no longer utilize energy that may be available, then it becomes progressively more susceptible to the more elemental forces in the environment, particularly to meteorological change. Alterations that are seemingly of minor character may be portentous.

So, too, with Dr. Angle. Sensitive to the environment he always had been. Now with a damaged heart, it did not require much of a burden in the form of increasing cold to make the strain unbearable, and with that death followed. While here the effect of the meteorological environment has been traced in broadest outline, the reader who would study the many implications that must follow the recognition of the close integration of the human organism with the inorganic world, can begin at the very beginning of medical literature by turning to Hippocrates. Our more modern observations merely confirm the ancient ones.

We can take fate apart. We can predict the season when more of us will be ill and more will die. We can predict the years when the environment will be more taxing, when we as individuals will be more restless, more irritable, more productive; when whole groups, too, will become disturbed, with rebellion and war and panic in its wake—but these will also be times when more highly differentiated individuals of the type of Dr. Angle will finally be exhausted or finally die. Perhaps we can with propriety turn to Lincoln's penetrating philosophy which he expounded to his associate Herndon :

"Men are made by conditions that surround them, that have somewhat existed for a hundred thousand years or more.

"Man is compelled to feel, think, will, and act by virtue and force of these conditions; he is a mere child moved and governed by this vast world machine, forever working in grooves, and moving in deep-cut channels; and now what is man? He is simply a simple tool, a cog, a part and parcel of this vast iron machine that strikes and cuts, grinds and mashes, all things that resist it. The fates had decreed it and what they decreed is irresistible and inevitable."

"The fates and the conditions are the powers. Laws rule everything, everywhere, both matter and mind from the beginning to the end, if there was a beginning and an end." (The Hidden Lincoln).

Very likely Angle, too, felt the "forces of the vast world machine" in his very marrow, those laws that govern the universe, and in so doing govern the genius as well as the mob. His mechanisms had become unusually sensitive, partly because he was always on the verge of air hunger, partly because he was unusually slender, possibly because he had inherited that type of mechanism. This sensitivity but added the necessary stimulus to the highly alert cerebral tissue. Fate is shaped for each of us, sometimes it seems most complex but sometimes we can at least discern the pattern if we merely grasp more immediate factors, such as those of the atmosphere.

Long before Omar Khayam, Hippocrates said it in this way :

"Potters spin a wheel which shifts neither forwards nor backwards, yet moves both ways at once, therein copying the revolution of the universe. On this wheel as it revolves, they make pottery of every shape, and no two pieces are alike, though they are made from the same materials and with the same tools." (Regimen, Para. 22).

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