

ANTAEUS—CONTACT WITH THE SOIL.

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Fable, folk-lore, romance and poetry have all contributed their share toward preserving the experiences of the human race in its evolution. Mythology has always shown great fertility when cultivated by the philosopher, but occasionally the naturalist turns a spade to his own satisfaction. Perhaps some day we may reach a clearer understanding of the significance of mythological nomenclature, but until then our deductions even though somewhat fanciful may still give us a glimpse of an underlying truth.

It is a frequent observation among naturalists that the common experiences of mankind may at times be translated into scientific dicta—when sufficient data have accumulated for drawing conclusions. But the important and far greater task is that which concerns itself with the application of scientific information to the welfare of the race. A great question among educationists now is, how to get the individual of average mind, for his own good, to take advantage of the enlightened work of scientists.

But movements, like organisms, are attacked by parasites, and unfortunately the movement of “humanizing” knowledge has already fallen heir to the fate destined for all good things; and the general public is receiving the perverted and distorted facts of science. The wrappers of the breakfast foods, the circulars outlining the menu courses, and the labels for every form of drink present the “scientific” reasons for their use—all in the language and under the seal of “humanized” science.

Moreover, it is recognized by every earnest worker in science that his efforts are vain if no practical use will or can be made of his work and efforts; and he thus clearly admits the necessity of “humanizing” the results of his researches. A single instance in my own experience, however, demonstrates how much patience and time is required before practical results from seemingly obvious truths are secured.

In 1893, before the Indianapolis Woman’s Sanitary Society,¹ I read a paper on the rôle played by infected dust in the production of ill health and disease—particularly in communities where the tobacco-chewing and spitting habit prevailed, in which I insisted that the resulting state of filthiness on sidewalks and streets not only encouraged the catarrhal and tuberculous to add their pathogenic sputum, but also aggravated the nuisance and transformed it into an actual menace to health, giving rise to what is known as the infected dust problem.

Eight years afterward, while engaged in a special study of this infected dust problem and the causation and prevalence of ill health

¹ For a mention of and comments on this paper see the Indianapolis News of July 14, 1893.

and certain forms of diseases, at Logansport, I had the temerity to distribute copies of a pamphlet in advocacy of an anti-spitting ordinance and giving reasons therefor. In reality it was merely a reprint of my paper published in the Monthly Bulletin of the Indiana State Board of Health, for I had already begun a series of papers before our Academy, of which the present paper is a continuation.

At that time I was in correspondence with the late Dr. J. N. Hurty, Secretary of the State Board of Health and Editor of the Monthly Bulletin of the Board. He was a man who had early adopted my ideas and was convinced that the dust factor in the spread of diseases was entitled to earnest consideration. But although in full accord with my theory, he nevertheless advised going slowly in regard to practical measures, emphasizing that "We must take one step at a time, as you very well know. You also know that we cannot arrive at the very top with one bound."

I might add that one result of my effort in regard to clean streets and sidewalks was to arouse the antagonism of a number of the worst chewers and spitters, some of whom "demanded the right to spit where they d—— pleased." Clearly the man who remains silent has the smoothest sailing.

In the light of the above, and at the risk of self-condemnation in my attempt to "humanize" the scientific work on which I have been engaged for nearly 40 years, I shall in this paper present one aspect of the philosophy of The Domestication and Urbanization of Man by drawing a lesson from Greek mythology—the celebrated victory of Hercules over Antaeus, son of Poseidon (Neptune, lord of the sea) and Gaea (goddess of the earth).

The story runs that Antaeus, a famous wrestler of Libya, was invincible so long as he remained in contact with the earth, his mother, for his strength was renewed with every contact with the soil. Hercules, however, discovering the source of the strength of Antaeus, lifted him from his mother-earth, and strangled him in the air.

If we trace for a moment our mythological figure through English literature, we find him appearing in Spenser's *Malegar* (Fairie Queen), whom Prince Arthur was able to conquer by lifting him from the earth. Erasmus Darwin refers to the same figure in his "Economy of Vegetation," and the frequent allusion to a "return to his native air" in English biographies reveals the old belief that the simple-life conditions of youth were conducive to the restoration of health and strength. From many pages of the "Life and Letters of Thomas H. Huxley" we can glean the benefits to be derived from contact with the soil, and in a single page the biographer, although perhaps unintentionally, has contrasted the deleterious consequences of too much artificial life in the city with the salutary effects that attend contact with the soil. (Vol I, page 154.)

But in our own country we scarcely know the significance of the term "native air," although in David Grayson's "Adventures in Friendship" the author catches a glimpse of an old truth when he asserts that "with my feet upon the earth, I am invincible and unconquerable," and "at each step my strength is renewed."

One is here reminded of a full-page nostrum advertisement carried in some newspapers 20 or 25 years ago to the effect that a certain rich man had offered a million dollars for a new stomach. An advertisement suggested the use of a nostrum, but evidently the rich man followed sounder advice, for we find him today playing golf in Florida during the winter, and in summer enjoying the free air of his northern estates, thus proving that also in his case "contact with the soil" means health and longevity.

To understand men like Thoreau and Burroughs and Muir there is need for a proper orientation in regard to the environment of men,—its influence and effect not only upon the physical nature or constitution but also upon the temperament—the psychical nature and mentality, and we should keep in mind the old story of Antaeus retaining vigor and regaining strength.

To further impress this lesson from mythology, romance, poetry, or from the biographies of those who have passed away, one may refer to a shining example of today,—President Coolidge, who takes his vacations "in contact with the soil." On the contrary, when the late President Wilson returned from Europe, where he had been subjected to a terrific mental strain, and then plunged into a stump-speaking tour, taking upon himself the herculean task of seeking to educate his country to the importance of entering the League of Nations, he subjected himself to crowd conditions,—to reactions that have proved fatal to many a public speaker.

The student of domestication and urbanization must feel that had President Wilson, immediately upon his return from Europe, taken a short rest cure with its prime essential, clean air, history undoubtedly would record far different world effects from the outcome of his subsequent western trip than the tragedy which befell the head of the nation.

This idea of "contact with the soil" embodies profound truths which mankind has garnered from long experience; but these truths, in order to be effective for the welfare of the individual in this complex age, must be presented in a scientific manner. Intelligence today will not, and should not, be satisfied with fable and adage, for the impression on the mind today must be clear and distinct.

Man is indissolubly connected with his remote ancestry, and modern scientific aspects contain the reflections of his past. The biological or life history of man begins where the histories of all forms of life begin. Nature is one. The struggle for existence and the survival of the fittest are not mere phrases, but are definite concepts embodied in accepted laws defining the conditions under which life has and continues its being.

The ascent of man from primeval conditions or stages is characterized by a succession of struggles against opposing forces. The antagonisms which man is compelled to meet, to maintain himself and perpetuate the species, are not only those of the struggles with other forms of life, but there are also the cosmic or planetary elements to contend with,—earth, air, fire, water, and the various factors that enter into what is called climate—the myriad results usually referred to as

geological and terrestrial changes, not forgetting "the earth as modified by human action."

In the primitive or savage state man's contact with mother earth was supreme, and he was bound by no law not binding on other organisms. Out of place, he succumbed; in his proper place, he stood an even chance with other organisms. Life in the hunting and fishing stage was very simple, and what we call "health" took care of itself, as it does today among those who "live in contact with the soil."

In the barbarian stage man became more concerned with the survival of himself and his progeny, he began to free himself from dependency of simple natural conditions. His efforts included the making of a domicile, a home for his family, better conditions for his progeny. The cave and hollow tree of the savage were abandoned, and in time his tent became a permanent home, lifted from the ground, a first stage removed from direct contact with the soil.

The advent of the pastoral stage made man less dependent on immediate natural conditions, and although he followed his herds and flocks to good pastures in a movable tent, it was still a contact with the soil. At the same time it was a contact with animals, and the pathologist would here find occasion for much speculation in regard to the evolution of infestations by parasites of many kinds. The modern "milk problem" is complicated by the fact that the milk may pass through many hands before it reaches the consumer.

As a result of the constant shifting of the home during this tent-life stage, leading the herds to fresh pastures, there was no polluting of the water supply for man or beast nor a polluting of the soil. All this comes later. The agricultural stage, however, meant a fixed home, it meant to take care of the growing crop and storing it for the winter season. Living conditions now became better, less precarious, and man for the first time was able to give attention to the aged and to the sick, to those who under simpler life conditions had little chance of surviving the savage or nomadic life struggle. Here again the pathologist can speculate as to the evolution of all sorts of infections, in distinction to infestations, for here we find the origin of a great modern problem, which one might refer to briefly as "rebreathing air."

Domestication has been man's creation and has brought him problems unknown to earlier stages; and when houses come close enough together to form villages which in time become towns and cities, with the advent of the handicraft stage, we meet with the problems of urbanization, a stage in which many a man finds himself far removed from the simple out-door life of the hunter and fisher, of the herdsman and of the agriculturist. This lack of contact with the soil may reach an extreme stage in the case of the dweller in the modern industrial city. Cities, in the past, and still largely so today, are the graveyard of man.

The growth of the city had given rise to all sorts of problems, and there is a series of terms derived from the Latin word for city,—*urbs*. *Urbane* includes the need of conforming to the mores of the city, with all sorts of laws, regulations and ordinances to be obeyed. Yet we are only beginning to recognize the need of obeying the unwritten laws of

nature and her warnings, that primarily man is still an animal, and that contact with the soil, much or little contact, is necessary to survive, both ontogenetically and phylogenetically. It emphasizes again the need of simple life conditions to maintain families, or, in other words, as an antidote to so-called race suicide. Here we can get some valuable ideas from biographies, notably biographies that refer to London conditions.

Urbanity carries with it the idea of polite behavior and polite learning,—academic life and art; but there also enters the idea of cloister life,—studying the heavens and neglecting the soil under foot. The path of civilization from the cave and tree of the savage to the lecture room of the student and the laboratory of the modern scientist is indeed strewn with the skeletons resulting from environmental antagonisms.

Every change of environment has placed upon man new burdens, and the extent to which he has been able to overcome them successfully has determined his degree of civilization. Adaptation to city life is carried on at an enormous loss. Adjustment to indoor life conditions may be impossible to the unadapted. The modern city requires men to fill all sorts of positions, from the lowest to the highest—from those where little mentality is needed to those demanding the brain of the superman. Under city conditions vocations vary from those where men are confined indoors and lead a sedentary life, to those with more or less active life out of doors. But all are wholly dependent on life conditions that are artificial,—on food that has passed through many hands, on water that has been brought in from a distance, on air that has perhaps been breathed over and over, and on shelter that differs widely from that of primitive man. The climate with which savage man had to contend was the natural climate; but today so-called civilized man in our latitude lives in an artificial climate for half the year, and therefore it is no wonder that our city children are at times referred to as hothouse products, lacking all proper contact with the soil. How do they fare?

The chief problems of man today are those growing out of domestication and urbanization. All the arts and sciences now make their major contributions toward furthering the evolution of the home and the city. That is what is meant by civilization. But in some aspects man has not met the issue of civilization with the same degree of success. Nations still settle their differences by the final appeal to the sword. The League of Peace is much talked and written about, but it may be difficult to find a good friend of the man who most concerned himself with such a league. Although science, as represented by the chemist, the bacteriologist, the immunologist, and many others, is tremendously engaged in the laboratory and clinic in seeking to discover new "cures" and, in general, in developing new methods to make or to keep us well, whole and sound, nevertheless hospitals are multiplying as never before, and ill health has become a constant attendant on the lives of the great majority of men and women, and alas, even of children.

The alleged lengthening of the span of life does not apply, unfortunately, to the lives of many whose longevity and mentality should be prolonged,—too many of our brightest and best still die prematurely;

it seems, shall one add, that hospitals and asylums are developed with a view of prolonging the lives of the defectives, dependents and delinquents. The anthropologist, the biologist, the eugenist and the humanitarian may agree with Dean Inge that too many lives are "saved" that are not worth saving, and that the misery of many is prolonged through excessive hospital and misguided asylum care. But for conscientious physicians, who of all men have the best insight, to discuss such matters openly would mean professional suicide.

Physicians speak of the great increase in morbidity and mortality of "degenerative diseases," of the great loss of men at an age when they would be at their best and when their advice and counsel would be of great value to the young and to the nation. It is rare and exceptional for an occupant of the White House to reach the proverbial three score and ten. Even more tragic, because intimately affecting so large a number, is the death of physicians, men who might be assumed to know the underlying factors and to take measures to avoid premature death.

What have we lost or what have we failed to acquire in the development of civilization that so places man's health in constant jeopardy? We are certainly spending a lot of time and money on matters pertaining to health and disease. Is it perhaps that the efforts are directed along lines no longer fruitful, perhaps antiquated? It may be that the time has come for a re-orientation. Certainly a new view must be taken of man's health and how to keep it, and the problems growing out of his multifarious attempts to "keep fit."

The proverbial sound body may keep fit for a long time on coming in contact with unsanitary city conditions, and some things we may do to maintain "keeping fit" may have only a remote if any actual effect. But with advancing years, the only real remedy is offsetting—contact with the soil.

One thing is certain. Under domestication and urbanization man has steadily moved farther and farther away from the conditions where contact with the soil was easy. Nature no longer supplies man in his complex environment with pure food, good water and clean air; and it is everywhere evident that man is not providing these under the former simple-life conditions.

Although we may drink good water while eating food of doubtful constitution, it may be under air conditions that are wholly abnormal. The problem of good water was one that cities had to master early, and the question of good proper food is receiving great and constant attention, but what is a proper dietary is a question that has not been settled,—the man who follows a text-book on food and diet that is five or ten years old would be pronounced an old fogey. Yet to the man leading the simple outdoor life the question of food and feeding usually resolves itself simply into the question of getting enough to eat, on a par with the rest of creation.

As just indicated, the question of good water and of good food have received much attention, technical problems that go with such matters being gradually mastered; but so far, man has utterly failed to make adequate provisions for pure air. Fresh air may not at all be pure

air, and in cities it is not clean air. Even in the case of hospitals the surroundings are usually such as to preclude even the suggestion that the question of clean air had been given proper consideration, much less first consideration. Eating and drinking occur at fairly regular intervals, and proper care to get food and drink can be exercised as may be deemed best, but the process of breathing is continuous, inhalation and exhalation occurring every minute. The weight of the air we use far outweighs what we eat and drink.

Formerly the nostrum maker had all sorts of remedies and cures for the ills attending the use of food and drink, but today he seems to find it more profitable to advertise nostrums for affections and conditions of the respiratory system. Halitosis is an old term for bad breath, but how many now using the word ask the where, when and why?

How very slow has been the appreciation of the value of good, clean or pure air to man. Until recently it has been almost entirely neglected. Whenever the question of "fresh air" has come to the front in public discussion there usually has been some motive other than human welfare that has actuated the agitation. The value of and clamor for clean air in cities finds a ready response from merchants, who desire conditions that will longer preserve delicate fabrics and perishable goods,—unsold merchandise. There is also a demand for sootless air to avoid the expense of cleaning up, and this cleaning process extends all the way from your dirty neck and collar to the front of tall buildings in the heart of the city and to monuments perhaps topped by a flag so dirty that it is almost unrecognizable as our proud starry banner. The expense of cleaning up comes either directly out of our pocket, or is paid indirectly through increased taxes.

We are taxed tremendously to keep up our public school system, where efforts are made in regard to sanitation and hygiene. School children receive extra attention, teeth and throat are looked after by the teacher, and tonsils and adenoids are given attention. But the general city air, the air of public conveyances and the polluted air of factory environs, has not yet come into its own.

The ancients knew nothing of microbes, although Lucretius mentions the motes in the air. Today we are only beginning to understand the importance of the defensive system of the body and its rôle in protecting us from our microscopic enemies. The enormous scrofulous swellings seen in the highly unsanitary cities of Europe a hundred and more years ago have practically disappeared under sanitation, but additional knowledge, skill and attention will be required on the part of the sanitary engineer to change the conditions that favor enlarged tonsils and adenoids, and other throat and nose affections that now call for surgical operations.

It is essential that clean air be provided for the worker upon whose efficiency our whole social structure, indeed, our whole civilization, depends. Here and there a feeble voice is heard. Smoky air and dusty air are twin evils. The agitation against spitting in public places has made an impress; in the larger cities tobacco juice spitting on floors and sidewalks is now taboo, but emptying cuspidors into gutters may still be tolerated. Filthy gutters and filthy streets are still everywhere in

evidence. Pulverized filth arises as dust, and asphalted pavements may be swept clean by speeding automobiles and street cars. Dried and pulverized gutter filth arises as infected dust, a veritable poison to many. Cinder dust, only too often found on streets, is gritty and, where it carries infection, leads both to acute inflammation and to the ultimate formation of scar tissue; sclerosis may extend all the way from the skin to the internal organs and arteries, with impairment of normal physiological functioning. We supply the treatment for colds, catarrhs and the like, and there are countless assumed remedies for our Triad of American Diseases (catarrh, dyspepsia and nervous prostration), but prevention is still an open question.

We test the efficiency of the worker in the factories under improper and proper conditions of lighting, and we have worked out, perhaps motivated by lighting systems companies, schemes that increase the efficiency of the worker by giving him the proper and adequate light for his work. But so far tests on a comprehensive scale have not been made to determine the rôle played by the conditions under which he must breathe, neither quantitatively nor qualitatively, although, through the work of industrial commissions here and there, factory "airs" have been tested for pernicious contents incident to the particular industry.

It is rather anomalous that the school books on so-called Physiology and Hygiene should put so much stress on the matter of food, and be practically silent in regard to the air that we must consume to oxidize the food. We eat about three or four pounds of food per day, while at the same time we take in about 30 pounds of air,—air often of doubtful constitution. And as to the motes in the air, a bright beam of light, as in an illy ventilated movie, reveals them in countless numbers.

Until only a few years ago the term environment was rarely seen in the index of educational books, although educational psychologists had been using it for some time. It is likewise a rare term in the index of medical books, although during the last few years there has been an increasing use of the term in medical journals. Here is an interesting little subject for study by the bibliographer.

Frequently I have called attention to the great value of the study of biography in obtaining knowledge in regard to the influence of good and bad air conditions and effects,¹ and the need of offsetting indoor life by life in the open. The biographer must give more attention to the environment of his subject.

Just 20 years ago I presented before this academy a paper entitled "The Influence of Environment of Man," and the last two paragraphs of the abstract that appeared in the Proceedings for 1907 are as follows:

"Reaction to environment varies greatly, from a feeling of health to ill health and disease. Pain is to be regarded as a warning from nature and plays an important rôle in the process of adaptation to environment. Some strains or individuals are wholly unadapted to city life with its manifold disease-producing conditions. Many disease-producing conditions have been eliminated from city life today, others are more active than ever, notably the impure air factor.

¹ See for instance my paper on "Biography and the Influence of Environment," in the Proceedings of our Academy for 1908.

"A study of simple country conditions, or village conditions, or town and small city conditions may shed much light on the complex city life. Much of the ill health and disease of the large city is preventable, and the lives of many can be lengthened. The erection of more hospitals, as ordinarily conducted, is not a remedy for correcting the evils of city environment; the environmental influences are themselves largely to be altered. Much depends on education and there is urgent need for an institution that will take up the study of factors operative today." (The factors referred to are those operative in the process of the domestication and urbanization of man.)

In conclusion, let me again refer to my mythological inspiration, the story of the tragic end of Antaeus. Wrestling with the powerful Hercules he was invincible as long as he remained in contact with the earth; but he was vulnerable, and the weak spot in his defense was discovered by his enemy who separated him from the earth and strangled him in the air.

The dirty air of our cities is full of microbes constantly ready to attack those who lose contact with the soil. Some one has said that we live in a sea of microbes. Our defenses, and especially our lymphatic system, may be readily overworked, and if we do not constantly renew our strength by contact with the soil we shall fall victims to the very air we breathe—literally strangled in the air.

Until science has made sufficient strides to meet the problems above indicated, and until the sanitary engineer has convinced the people of the importance of clean air in the cities, there remains but one solution; the individual must regard his welfare from the viewpoint of the air he breathes. Clean air is the meaning of Antaeus—contact with the Soil.

