approximately 11′ 6″ in thickness; both overlay a thick stratum of shale above a vein of Pittsburgh coal.

A study of the geology of the region revealed that in the geological past the bed of clay formed the bottom of an ancient stream bed. Fortunately the mining operations cut across the strata, thus revealing the geological history quite definitely.

The portions of the skeleton recovered thus far consist of the heads of both femurs, the proximal end of the humerus, a practically complete right scapula, a number of foot and toe bones, together with portions of the vertebra. A number of other bony fragments are in the laboratories and will be assembled later.

Two large fragments of a molar were found and these have been fitted together. The figuration of the tooth and the marks established the identity of this animal definitely as a mastodon.

To the best of our knowledge this is the first report of the finding of mastodon remains in this section of the State of West Virginia. Thirty-seven years ago a portion of a tusk was found in a gravel pit near Brilliant, Ohio, eight miles west of Bethany, W. Va., on the west bank of the Ohio River.

It is planned to continue the search in the region of the original find and make a more detailed report at a later date.

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BORGMEIER'S REVISTA DE ENTOMOLOGIA. AN APPEAL TO ENTOMOLOGISTS

IN the field of entomology, many of us have depended for years on foreign journals, the channels for publication being wholly inadequate in this country. I notice, in my case, that in 1938 nearly half of my papers were published abroad. In the near future, some of the European periodicals will be completely closed to us, while others plan to carry on on a modest scale or even to suspend for the duration of hostilities. It seems most opportune to call the entomologists' attention to a New World publication, which, with the proper support of American workers, may well prove the ideal solution to our present difficulties. Started in 1931, the *Revista de Entomologia,* of Rio de Janeiro, is now running through the tenth volume, and has kept up an unequaled standard of excellence. Each of the nine completed volumes covers some 500 pages, adequately illustrated with text-figures and half-tone plates. The papers are cosmopolitan in authorship (being written in English, German, French, Spanish and Portuguese) and cover practically every phase of entomology, theoretical as well as practical. Each issue, of which there are now three to a yearly volume, concludes with an extremely valuable critical bibliography of neotropical entomology. This feature alone makes the *Revista* indispensable to all students of Central and South American insects. From the start, the *Revista* has been conducted as a labor of love by Father Thomaz Borgmeier, O.F.M., an entomologist of repute in his own field. As most European subscribers are likely to drop out at present, it is to be feared that the editor will run into some unexpected difficulties. All American entomologists are urged to rally to his support. Beginning next year, Father Borgmeier plans to accept for publication papers dealing with North American insects also. The editor's address is Convento S. Antonio, Largo da Carioca, Rio de Janeiro, Brazil.

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SCIENTIFIC BOOKS

MEDICAL CLIMATOLOGY

Medical Climatology. By CLARENCE A. MILLS. 296 pp. Baltimore, Md.: Charles C Thomas. 1939.

MILLS'S "Medical Climatology" is symptomatic of a movement which may become a mighty tide a generation hence. For two generations or more biological investigation has centered upon the organism itself far more than upon its environment. The structure of the cell, the mechanism of inheritance, the chemical composition of glandular secretions and the influence of bacteria and other internal parasites have engrossed attention. As a result not only have the ravages of infectious diseases diminished greatly, but new and valuable varieties of domestic plants and animals have been produced in great numbers. This progress, however, has gone hand in hand with comparative neglect of the other side of the shield. Our knowledge of how the organism is influenced by the external environment represented by climate, soil and so forth is still pitifully small. The botanists, to be sure, have recently made good progress in ecology, but only the merest beginning has been made in studying the ecology of animals and man. The significance of "Medical Climatology" lies in the fact that it opens up many new lines of approach to the fruitful field of human ecology.

The thesis of the book is that two main types of disease—infectious and degenerative—display opposite relations to climate. The basic reason for this, as Mills sees it, is that human metabolism varies greatly in response to weather and climate. Warm and monotonous climates lower the rate of metabolism; thus diminishing people's power to resist all sorts of infections. Cold and variable climates increase metabolism,

thus making people active, energetic and able to resist infection. Unfortunately, however, this metabolic activity places too great a strain upon the vital organs, thus leading to degenerative diseases of the heart, kidneys, nervous system, and so forth. Hence in warm, mild, enervating climates, infectious, parasitic diseases are especially common, whereas in cool, variable and stimulating climates degenerative diseases are dominant. Recent medical progress has greatly diminished the danger from infectious diseases, such as tuberculosis, diphtheria, measles, yellow fever and malaria. It has had little effect, however, upon the degenerative diseases, and these are increasing as the elimination of the infectious diseases lengthens the span of life.

Mills's thesis is that we fail to conquer the degenerative diseases because we do not recognize that their major cause is the incessant drive of cool, stormy and variable climates, which reach their greatest extreme in the north central United States. The most valuable part of his book is a series of maps showing that the death rate from a considerable series of diseases increases from south to north in the United States, and varies in corresponding fashion according to the climate of other parts of the world. The diseases include diabetes, goiter, pernicious anemia, leukemia, pneumonia, tuberculosis, appendicitis, arteriosclerosis and heart failure. Suicides and homicides behave in much the same way. Most of the diseases show a maximum death rate in winter and a minimum in summer. Mills shows that in general the geographical distribution of mortality from these diseases is the same for whites and Negroes, and also for both rural and urban populations. The Negro death rate, to be sure, always exceeds that of the whites, and the urban and rural rates may differ. In all cases, however, the variations from region to region are similar.

Mills takes issue with Winslow, Herrington and others who claim that such diseases owe their distribution mainly to urban conditions and to the intensity of modern industrial life. To the reviewer it seems that Mills does not pay enough attention to the fact that even in villages our modern urban and industrial life is quite highly developed, and that it surely has an effect upon health in general and upon metabolism in particular. On the other hand, Winslow and his coadjutors fail to pay enough attention to the fact that this kind of life is found only in climates that are highly stimulating, and that it would not be there to any such degree if the climate were different.

Another important point made by Mills is that in many infectious diseases the number of *cases* is especially high in the more stimulating climates, but the *deaths* in proportion to the cases are few. In warmer climates, on the contrary, the number of cases is small, but the death rate in proportion to the cases is high. His interpretation of this is that although the overstimulation of the cool stormy type of climate leads to degeneration of certain organs, its general effect on the body is so good that people are often able to overcome disease. In warm monotonous climates, on the contrary, if people become ill for any cause whatsoever, they have relatively little power of resistance. There the number of deaths is high in proportion to the cases, although absolutely low. In this connection Mills finds that China and, to a less degree, Japan behave like tropical countries. Western Europe is more like the eastern United States, while the north central part of this country is peculiarly subject to the stimulus and the diseases induced by low temperature and great storminess.

Here is Mills's own way of putting his main conclusion: "Atmospheric turbulence, with sudden changes in temperature and barometric pressure, is a factor largely responsible for the initiation of infectious attacks, particularly in the respiratory and enteric systems. But ability to successfully resist the invasion seems to depend closely on the energy level engendered in the population mass by the stimulation of the climatic habitat. People living at low levels of energy and bodily vigor in regions of moist heat show little ability to throw off infections that once gain a foothold. Fortunately, in most tropical regions of moist heat, atmospheric stability is the rule. Only in the somewhat limited areas of tropical typhoons is man doubly handicapped in his struggle for survival. In these regions such infectious (?) diseases as tuberculosis, leprosy, acute nephritis and acute appendicitis take heavy toll. In the cooler portions of the stormy temperate regions ability to fight infectious invasions rises to much higher levels. There it is that most remarkable advances have been made in the fight to lessen the infectious disease death rates. But while these advances are being recorded, energetic inhabitants of these stimulating regions are exhibiting an increasing rate of exhaustion and bodily breakdown that provides an evil foreboding of what may eventually result from the too intensive climatic drive (pp. 161–2)."

In spite of much that is convincing, "Medical Climatology" needs greater precision. For example, "in Greenland the Norse colonies died out around 1000 A.D. (page 278)." That is the time when they went there. They disappeared four centuries later. Again page 256 mentions "a time when Pittsburgh has just become adapted to heat more severe than that of Texas." The reader understands that Pittsburgh, where the average July temperature is 75°, has a hotter season than Texas, where the July average at altitudes under 3,500 feet is 80° to 88°. Mills fails to explain that he refers to a particular instance when a brief heat wave made Pittsburgh hotter than Texas.

Much more important is the author's uncertain attitude toward changes in barometric pressure, an attitude which is prevalent among many others. For instance, "Tropical typhoon storms sweeping eastward over the West Indies and Caribbean region bring added instability during the winter months. These latter storms cause little temperature change, but their sharp pressure fluctuations seem to bring many of the same body disturbances that are associated with temperate zone storm changes [page 222]. . . . There is a strong suggestion that the sudden change of barometric pressure which accompanies tropical hurricanes may be just as important a factor in promoting many types of infectious diseases as are similar changes accompanying temperate zone storms [page 216]. Nevertheless, ". . . our knowledge of the physiologic effects induced by pressure changes is still far too incomplete even to be called evidence. There are hints, however, that fluctuations in atmospheric pressure do result in marked alterations in certain body functions, particularly those of the nervous system, reflex acts and glandular activity [page 258]. . . . The only significant experimental results so far published," however, "are those of Smith, showing a positive water balance in the body with pressure reduction and a negative balance with pressure increase. Body tissues in this respect act as a sponge [page 54]." In spite of the scarcity of evidence, ". . . Sudden changes in air temperature and barometric pressure, as major storm disturbances sweep across the continent, seem to be the most potent factors predisposing to acute infectious attacks [page 123]."

In many other places changes in atmospheric pressure from day to day are mentioned as if on a par with changes in temperature. Smith's conclusions, to which Mills refers, are based on differences less than the probable observational error in one of his two experiments, and only a little larger in the other. Most writers on this subject take no account of the fact that whenever we drive among hills which cause our altitude to vary as much as three or four hundred feet, we subject ourselves to changes of pressure like those in an ordinary storm, but much more sudden. Nevertheless, no one is conscious of any effect. Mills tells us, however, that "tropical populations living in typhoon regions exhibit the world's most severe tuberculosis problems, . . . particularly . . . in such typhoon-afflicted regions as the Philippines . . . the West Indies, and parts of Mexico . . . that are battered by this type of storm disturbance [page 138]." The obvious implication of this last statement and of those previously quoted is that the changes in pressure accompanying typhoons or hurricanes, especially in winter, are a main cause of tuberculosis. This ascribes far too much to these tropical disturbances. In the West Indies as a whole, for example, there are only about four hurricanes per year on an average. In any one region there are far less. Jamaica, for example, near the center of the hurricane belt, had only 14 in 36 years. Moreover, there are few hurricanes in winter, as appears from the following data as to their total number in the entire West Indies from 1876 to 1911:

Jan.	0	Apr.	0	July	5	Oct.	44
Feb.	0	May	1	Aug.	35	Nov.	3
Mar.	0	June	8	Sept.	45	Dec.	2

Another feature of "Medical Climatology" which will at least arouse discussion is the map of climatic stimulation on page 82. It is based on (1) the difference between the maximum and minimum temperature of each day, (2) the difference between the maxima of successive days, (3) the difference between the minima of successive days, and (4) the number of days having temperatures above 64° and below 38°. From the standpoint of ordinary climatology and geography the resultant map seems inconclusive. It brings together regions which have little unity from the standpoints of vegetation, health or human activity. The greatest climatic stimulation is indicated in places as diverse as (1) the high Andean plateau within the tropics, (2) the plateau of Tibet, 25° farther north, (3) the plains of North America from Nebraska to the Arctic Circle, and (4) New Zealand. The northeastern United States, the North Sea region of Europe and a vast area in central Siberia, although reckoned by Mills as highly stimulating, are placed in a lower category. It must be clearly understood, however, that Mills distinguishes sharply between climatic stimulation and climatic efficiency. His whole book centers around the idea that the climate of some regions is so stimulating that its beneficial effect is in part counteracted.

In spite of these criticisms Mills's book is of high value. It blazes a pioneer trail in its suggestion that the study of climate may be the clue which will lead ultimately to a reduction in metabolic or degenerative diseases comparable to that which has taken place in infectious diseases. It also contains a number of interesting minor suggestions. For example, the place for sanitaria is not where a given disease is most common, but where it is rarest because that is where the climate helps to eliminate the disease. If all lepers were taken to Switzerland, the disease would presumably disappear. Again, dental caries increases not only from south to north in the United States, but as one goes downward in river valleys. In a book where so many new ideas are set forth, the chance for error is necessarily great. On the other hand, the searcher for fruitful research problems in the rich new field of the influence of physical environment will find in this book a perfect mine of valuable suggestions.

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