THE CLIMATE OF THE NORTH AND NORTHWEST IN ITS ETIOLOGIC AND THERAPEUTIC RELATION TO DIS- EASES OF THE NOSE, THROAT AND EAR.*

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"The climate of a region or site is the combined effect of the atmosphere and of the nature of the surface, in their relation to man." The weather is merely a phase of the climate, changeable from day to day.

The atmosphere varies in chemical composition, in temperature, in pressure, humidity, diathermancy, transparency, dust, electrical conditions, and in the force and direction of the winds. Other factors are latitude, altitude, relations to large bodies of water, deserts, etc., nature of the soil, surface, i. e. slopes, plains, valleys, etc., cultivation of the soil, drainage, manufactories and density of population.

The untutored savage has always looked upon the natural phenomena with awe and reverence. It is not strange that to-day, certain individuals hold the climate responsible for their aches and pains. They likewise think of some climate, other than their own, generally those described by railroad circulars, as the panacea for all their troubles.

As knowledge replaces theories, the direct influence of climate in the etiology and treatment of disease, becomes less prominent.

Twenty years ago malaria was considered to be a direct result of climate. A certain "miasma" arising from swamps was thought to be the cause of the disease. We now know that malaria is due to a protozoon transmitted to man by the mosquito. Until recent years yellow fever and the "sleeping sickness" were considered to be in some way caused by the tropical climate. Reed, Lazear and Carroll demonstrated beyond doubt, that the infection of yellow fever is likewise transmitted to man by the mosquito. Koch has recently shown that the sleeping sickness of Africa belongs in the same group. The hot climate offers conditions favorable for the existence and spread of these diseases. Typhoid fever, influenza, pneumonia and many other diseases formerly considered to be due to climate, are now known to be caused by bacteria.

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Although man can exist in any climate, hot or cold, moist or dry, high or low, where food is sufficient to support life, or the natural enemies are not too numerous, his physical, mental and moral make-up are influenced by the external conditions.

Experimental work on animals has shown that chilling, either by ether spray, or dipping into ice water, is generally followed by cloudy swelling, and granular degeneration of the hepatic and renal cells, with fever and albuminaria. While these experiments are not applicable to man, they show that excessive changes in temperature will cause, at least in animals, pathologic conditions. Lode found that animals chilled by wetting the fur more readily succumbed to infections. This may explain why pneumonia, rhinitis, and other acute inflammations of the respiratory tract, that so frequently follow a chilling of the body, are due to infection following a lowering of the resistance.

The climate of the north and northwestern part of the United States, east of the Rocky Mountains, would be classed, according to Koppen, as a cool temperate climate, i. e. monthly averages above 68° F. are limited to the summer months.

In such a vast territory, extending nearly 2000 miles from east to west, and 500 miles from north to south, with the same general climate there are many variations. In a paper limited as to time, it will be impossible to speak more than in general terms of these minor differences in climate. The climate of a certain locality is often quite different from regions only a few miles distant. A southern exposure is generally warmer and more protected from the winds than a northern, valleys are generally damp, the air of the hills and mountains is dry.

The winters of Minnesota and Northern Maine are long and rigorous, the summers short and often sultry. The winters in regions 400 miles south are mild, the summers long and semi-tropical.

The mountain ranges along the Atlantic coast offer a cooler and drier climate than regions near the ocean.

The amount of sunshine, in different portions of the North, varies considerably. In the winter of 1901 at Buffalo, New York, there were 56 cloudy, 34 partly cloudy and no clear days, while at Atlantic City there were 22 cloudy, 32 partly cloudy and 26 clear days. In general, along the Atlantic coast, the sunshine increases as we go south and the fog becomes less.

The prevailing winds are from the Northwest and South. The former are dry, the moisture having been precipitated on the western slope of the Cascade Mountains. The moist south winds, a part of the trade winds, travel from the Gulf up the Mississippi Valley. The New England coast in the winter time is often swept by cold damp gales from the North and Northeast. Fogs so frequent along the Atlantic coast are rare in the Northwest.

The so-called dry steady winters of the Northwest show as great a daily range of temperature as in the East, but it is less noticeable to the individual. A drop of 20° in temperature, from 50° to 30° F., is more noticeable than an equal change of temperature from 20° to zero.

The humidity varies considerably, being greater near large bodies of water. The climate of the Northwest has for a long time enjoyed the reputation of being dry. This, according to weather reports, is more apparent than real. Owing to the lower temperature, the absolute humidity of the Northwest is less than the Eastern States. The mean relative humidity is about the same as that of the middle Atlantic coast. Below 55° F. the evaporation of cutaneous moisture is so slight that the humidity is not noticeable.

With the exception of the mountains along the eastern coast, the elevation is for the most part under 1000 feet.

It is undoubtedly true that a large percentage of the inhabitants of the northern part of the United States are sufferers from what are commonly grouped under the indefinite but comprehensive term "catarrh." It is well known that acute inflammation of the respiratory tract, the "colds," the "coughs" and the "sore throats" are not as frequent in the summer months as during the rest of the year. Nasal stenosis and excessive secretion are more common in cold weather.

This is due to the extra work thrown on the nose in warming and moistening the cold, dry air. Inturgescence of the turbinates occurs if the nose is narrow or deviations or spurs exist; stenosis results and this is followed by an increase in the amount of nasal discharge.

It is also true that individuals with adenoids, hypertrophied turbinates, chronic pharyngitis and laryngitis, are worse during the winter months. That these diseases of the respiratory tract are not due to cold *per se* seems probable from the fact, that the original inhabitants and early settlers were relatively immune.

A cold climate is bracing and adapted for the maintenance of vigorous health. The activity of the individual is greater, more CO_2 is said to be given off by the lungs and muscular power is increased. With moderate changes in temperature the individual's resistance is increased.

In considering the effects produced by climate, in its relation to disease, we must take into consideration a far more important factor,—the artificial climate. In the northern part of the United States, the individual lives for nearly eight months under the unnatural conditions of this artificial climate. In the East and Central States, five or six months are spent in the natural climate, the remainder in the artificial.

This artificial climate is an outgrowth of our modern civilization. By this I do not refer to the changes produced by the drainage of swamps, the felling of forests, etc., but to certain far more important changes; of these may be mentioned:

First, Crowding.—According to the United States census of 1900, 31.3 per cent. of the total population lived in cities of 8,000 or more. This herding together increases the spread of infection, especially diseases of the respiratory tract. As a rule the denser the population the more unsanitary are the conditions.

Second, Dust.—In the city the pure air of the forest and prairie is replaced by a smoky, filthy, dust laden atmosphere. Dried sputum and excrement from many horses, pulverized by the constant traffic, thrown into the air by street cars and automobiles, is blown into our eyes and nostrils. No window casing is tight enough to keep it out of our buildings. The constant breathing of such dust laden air, even if the bacteria have been killed by the action of the sunlight, must have an irritating effect on the respiratory mucous membrane.

Pneumonia, influenza, and tuberculosis are in many cases dust infections. Could the infection be traced, doubtless acute rhinitis, tonsillitis, conjunctivitis, might be included in the above. Polishers, stone-cutters and grinders, are frequently sacrificed to their occupations, by the constant inhalation of sterile dust.

Health officers say that after a few bright, warm, dry, dusty days, the number of cases of infectious diseases is sure to be increased. The severe influenza epidemic of 1889 followed a mild, open winter and autumn. The same is true of the past winter in the Northwest. There is much truth in "A green Christmas means a fat graveyard."

Third, Overheated buildings.—As has been stated, during six to eight months of the entire year, a large percentage of the population live in a semi-tropical climate. Houses and offices are heated by steam, hot air, etc., until the temperature is 70° F. or over. The humidity in most cases ranges from 5 per cent. to 10 per cent., when it should be 50 per cent. to 70 per cent. In zero weather to give a relative humidity of 65 per cent. would require in the average house with a temperature of 70° F. the evaporation of six gallons of water.

Fourth, Sudden, and marked changes in temperature and humidity.—In the natural climate a fall of 20° in temperature as from 70° to 50° F. is very noticeable, an equal fall from 20° F. to zero is not so apparent. Although in the Northwest the changes in temperature are just as marked as along the Atlantic coast, the changes in the winter are not so noticeable on account of the low average thermometer. In the winter months the changes from the hot, dry air of our buildings to that of out-of-doors may range from 30° to 100° F. The suddenness of this change is not to be compared to that of any natural climate. The effect of this change on the respiratory tract, is far more serious and likely to cause irritation than cold.

Fifth, Deficiency of Sunlight.—This is due not only to the thick pall of smoke covering most of our cities, but to the indoor life led by a large proportion of our population. The bactericidal action of light is an important factor in preventing the spread of disease.

Pneumonia, influenza, acute sinusitis, diphtheria, acute otitis media, tonsillitis and probably acute laryngitis, rhinitis and pharyngitis, are due to bacterial infection. Sudden changes in temperature, dust, and mouth breathing, lessen the resistance and make infection possible.

Repeated attacks of acute inflammation, especially when the individuals live under unnatural conditions, lead to permanent changes in the tissues. We thus have hypertrophy of the turbinates, adenoids, enlarged tonsils, chronic sinusitis, polypi, and chronic inflammation of the larynx and pharynx. A large percentage of chronic catarrhal otitis media cases are secondary to diseased conditions of the nose and naso-pharynx. The tinnitus accompanying such conditions is in some cases undoubtedly influenced by the atmospheric changes. These cases frequently improve in hearing and the tinnitus ceases after free nasal respiration has been

established by operation. Practically all cases of hypertrophy of the turbinates, adenoids and enlarged tonsils, cases with dry and the secretory form of catarrh of the middle ear are better during the summer months. The cold or rather the sudden changes from hot dry houses to the cold winter and autumn air aggravate the conditions. Patients who go south for the winter find relief.

True hay fever or rose cold, occurring in May and June, is not common in the United States. Our so-called hay fever occurs in the late summer and autumn. There can be but little doubt that in a large percentage of cases the pollen-toxin of the rag-weed or Ambrosia is the exciting factor. Britton and Brown, give the distribution of the genus Ambrosia as follows: From Nova Scotia to Florida west to British Columbia.

In the North the plants are poorly developed and the amount of toxin is less than in those growing farther south. The plants bloom about the twentieth of August in the region about New York City. Sufferers find relief in the mountains and the north shores of the Great Lakes. The disease is rare in the region of Lake Superior.

Tuberculosis of the larynx is a disease practically always secondary to pulmonary tuberculosis. Cures of the latter condition are obtained in almost any climate. A moderately cool, dry climate with much sunshine has a more stimulating effect than a warm climate. Climate plays no role in the etiology of tuberculosis of the larynx. In regard to the treatment, the general resistance must be increased and a mild climate with a dust free air is to be desired.

Acute diseases of the upper air passages are not subject to climatotherapy except as to prophylaxis. The chronic diseases of the upper respiratory tract, as adenoids, hypertrophic rhinitis, inturgescence, etc., cause less disturbance in a mild warm climate, not subject to sudden change.

The climate of the North, while both directly and indirectly being of much importance in the etiology of disease, has but little value in the treatment.

Conclusions—

First. The influence of climate in the etiology and treatment of disease has been over-estimated.

Second. Acute and chronic inflammation of the respiratory tracts are more frequent and worse during the winter months.

Third. These conditions are not due to cold but to certain artificial conditions under which the individual lives from six to eight months,—the artificial climate. This includes crowding, dust, over heated rooms with dry air, sudden changes from heated rooms to the cold outside air and deficiency of sunlight.

Fourth. Diseases of the ear, nose and throat are common in the North, due to the above conditions.

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A Case of Primary Bilateral Mastoiditis. P. G. GOLDSMITH, M.D.
Montreal Med. Journal, Oct. 1907.

Following Grippe, pain in vertex and along posterior auricular with tenderness of posterior cartilaginous walls of both ears were noted. Hearing and membranes normal. Swelling of walls of external auditory canal quickly ensued with mastoid tenderness. Both mastoids were opened, existing disease with pus containing pneumococci was found.

WISHART.

Motor Paralysis of the Superior Laryngeal Nerve. E. KRONENBERG. *Monatsschrift für Ohrenheilkunde*, Oct. 1905.

In this interesting and unusual case the paralysis of the motor branch of the superior laryngeal nerve was caused by the pressure of a tumor upon the side of the thyroid cartilage. There was no sensory disturbance in the larynx, no paralysis of the epiglottis. The voice was peculiarly deep and creaky; high notes could not be produced. The vocal cords were slightly reddened, the paralysed cord being situated lower down in the larynx than the normal cord. Occasionally the paralysed cord was shorter and bowed outwards, but this condition was not constant. The author believes this was due to a temporary paresis of the thyro-arytenoideus internus. The case was not under observation long enough to determine the effect of the removal of the tumor upon the paralysis.

YANKAUER.