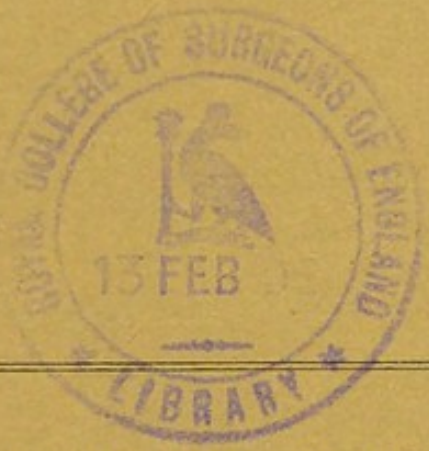
The climate of Calgary in the treatment of tuberculosis / by Ernest Wills.



THE CLIMATE OF CALGARY IN THE TREATMENT OF TUBERCULOSIS.

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ERNEST WILLS, M.D., M.R.C.P., Eng.
Physician Superintendent to Calgary Sanatorium.

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The question of climate in the treatment of tuberculosis, pulmonary tuberculosis especially, is of widespread interest and at the same time the subject of such varied views that its consideration seems worthy of attention.

Discussing first, the main principles of climate, both at sea level and higher altitudes, the bearing of these facts on the treatment of tuberculosis in the Northwest, of which Calgary is the best district, will be considered, and will show the value of climate in this disease especially, as well as in others.

The word climate or Greek " klima ", derived from the verb "klinein " to slope or incline, was originally applied by the ancients to signify that obliquity of the earth's surface with respect to the horizon, from which results the inequality of day and night. The early astronomer and geographer Ptolemy, about A.D., 140, divided the earth's surface into a series of parallel climates, or zones, which differed from each other by the same movement in length, namely 15 minutes of the midsummer day. Again, Edrisi or Aldrisi, the most eminent of the Arabian geographers who flourished in the 12th century, in his magnum opus: " The going out of a curious man to explore the regions of the globe, its provinces, islands, cities and their dimensions and situation." divided the world into seven climates, commencing at the equinoctial line and extending northward to the limit at which the earth was supposed to be rendered uninhabitable by cold, each climate being subdivided by perpendicular lines into eleven equal parts, beginning with the West Coast of Africa, and ending with the East Coast of Asia. The author takes these subdivisions one by one, from west to east, and south to north, and describes their characteristics.

It may be easily seen that these climates would have different atmospheric conditions according to their situation, since the power of the sun's rays, perpendicular to the earth at the equator, becomes less towards the north as they become more oblique. And so when the division of the earth's surface into climates was abandoned, for the more scientific partition by the lines of latitude and longitude, the term "climate" though remaining, had another significance, and denoted not the earth's slope or inclination, but the atmospheric conditions of heat, moisture, winds, rain, clouds and electricity, the variations of which depend, to a certain extent,

on this inclination or slope. Climate is quite distinct from weather, since it is possible to have very bad weather, the particular condition, in a place which has an excellent climate, the general condition. By a change of weather is meant such changes of the above conditions as occur daily, and since these changes are dependent on and intimately bound up with atmospheric pressure, the latter, as indicated by the barometer, is the key to the weather.

Climate may be defined as the average condition, meaning thereby, not merely the general average of all values of temperature, wind rainfalls, etc., but the extreme values and the averages of the extreme values for long periods of time. Apart from average climates, there are deviations such as extremes of cold or heat, or of extreme humidity or dryness, such as the extreme cold experienced throughout Canada, more especially Eastern Canada, during the past winter, or the extraordinary fall of snow in May, last year, in Alberta. There may be liability to storms of wind, thunderstorms, fogs, hail storms etc., but these exceptions do not alter a climate, since they are due to cyclonic or anticyclonic disturbances of infrequent and irregular occurrence.

Change of climate does occur, but is much more gradual than change of weather, and due to more important and lasting causes. In the past, gradual or sudden changes of the solar system, or in the earth which is dependent on the former, have caused very different climates, as shown by geological evidence, while more recent and more easily traced changes are due to human agency. The removal of forests, and the laying bare to the sun and wind of areas previously kept cool and damp, or protected from tempests, have rendered large areas of country dry and arid, as in the desert countries bordering on the Mediterranean. Cultivation and drainage, since these rapidly remove rainfall, and therefore, lessen evaporation, which in turn lessens rainfall, gradually raise the temperature of a country. This has happened in Manitoba, where since cultivation has become more general summer frosts are almost unknown, while formerly they were a great drawback to the wheat farmers. By transforming moors and bogs into cultivated land, and clothing hillsides with trees, rainfall may be increased, and in low countries malaria may be lessened or abolished with the removal of sloughs and stagnant pools in which mosquitos deposit their eggs.

It remains true, despite extraordinary incidents and changes just mentioned that climate, the average climate, is fairly constant in any particular area or country. The variations of climate in different parts of the world, however, are infinite, consisting as they do in different combinations and proportions of wind, temperature, moisture and rainfall at different distances from the equator, from the sea—the chief source of rain—or above the sea; a potent factor is the distance from the

equator, since, in proportion to this distance is the obliquity of the sun's rays, and the absorption of heat by the atmosphere is again in proportion to the length of their path. In general, one-half of the heat received by the illuminated atmosphere is absorbed by it leaving the other half to reach the surface of the earth, if there be no intercepting clouds.

If the earth's surface was uniform, the climates, into which Ptolemy and Edrisi divided it, would show equal differences of heat and sunlight; but its unequal division between land and water, water being greatly in preponderance, brings about a subversion of the ancient solar climes.

Aqueous vapour, in the diverse ways in which, in different localities, it is distributed through the hours of the day, plays the most important part in giving to the different regions of the globe their infinitely diversified climates. The temperature of the air at the surface of both land and ocean and throughout the atmosphere, as modified by winds and aqueous vapour, is the fundamental element in climatology; therefore, temperature, as exhibited by means of isotherms, or lines of equal temperature, drawn on charts of the globe and passing through places having the same temperature, although they may be of quite different latitude, longitude and altitude, is of the greatest use as a guide for the traveller, the agriculturist and the invalid.

Winds may be regarded as caused directly by differences of atmospheric pressure, just as the flow of rivers is caused by differences of level—the motion of the air and the motion of the water are both referable to gravitation. Wind blows from a region of higher towards a region of lower pressure—from where there is a surplus to where there is a deficiency. Let there be produced a concentration of aqueous vapour over a particular region, or let one region have a higher temperature than what prevails around it, then, from the different densities and consequently different pressures thereby produced, movements of the air or winds set in to restore equilibruim. Again, if there be a region of warmer air, this air will ascend and colder air will flow in to take its place; or if one region be more highly charged with aqueous vapour, and therefore lighter the air will ascend and drier air come down, or in, to take its place. Since some of the vapour as it ascends will be condensed into clouds or rain, heat will be disengaged and equilibriumm still further disturbed. From such causes originate gales, storms, tempests, hurricanes, cyclones, etc., of which the most marked examples are experienced on or near the ocean, owing to the difference of temperature between sea and land; also inland, in the vicinity of great lakes or inland oceans, and in the great inland valleys and plains where the necessary differences of temperature and pressure frequently ocur, from the great columns of hot air, formed over these vast districts in hot weather, ascending and cold air rushing in from regions of higher pressure to take their place.

The ocean is the chief source of rainfall, and to prevailing winds, the carriers of this rainfall, we look for its explanation, the principles being as follows.—1. There is a large rainfall when a wind has traversed a considerable extent of ocean. 2. There is increased rainfall if winds advance into colder regions, with increased precipitation when ascending a range of mountains, and decreased precipitation when descending on the opposite side. 3. Winds coming from the ocean, but not traversing a considerable extent of it do not increase the rainfall. 4. Winds may traverse a considerable extent of ocean, but if proceeding into lower latitudes or warmer regions cause little rainfall, thus the summer climates of California, Southern Europe and Northern Africa have little rainfall.

Climates are, therefore, divided into marine and inland, characterised respectively as moist and dry, from the relative proportion of aqueous vapour, and it is the dryness of the inland climates, especially of inland regions at higher altitudes—of which the chief characteristic is their low humidity—which makes them so beneficial to the sufferers from Tuberculosis. The effect of winds and temperature owing to this difference in humidity at sea level and higher altitudes is very different. A wind charged with aqueous vapour being much more trying and feeling much colder than a less humid air, all winds from the ocean and great lakes are more perceptible and more to be feared from a health point of view. The same applies to the cold air and mists which form at night in valleys owing to the rapid sinking of the air, as it cools in contact with the slopes—themselves cooled by radiation, and its increase in humidity as its density increases.

The gaseous envelope around the earth consists of two atmospheres, a dry constant air composed of Nitrogen and Oxygen; and an aqueous atmosphere, or Hydrogen and Oxygen in gaseous state, which is inconstant, since it does not remain in gaseous state, but is constantly changing by evaporation, condensation and change of temperature; also more aqueous vapour is being constantly added from the surfaces of water, snow, ice, plants, trees and moist surfaces generally. Evaporation increases with temperature because the capacity of the air for vapour is thereby increased. Air can contain only a certain amount of vapour, when saturated evaporation ceases. During a wind, since fresh air is constantly taking up moisture, evaporation is more rapid. As air expands its temperature falls, and it continues to approach nearer saturation until condensation occurs, and dew point is reached. Thus ascending currents of air become moister until there is formation of clouds, rain, snow, hail, etc., and conversely, descending currents of air, or air becoming denser, become drier.

This varying amount of aqueous vapour is measured as humidity.

Absolute humidity, accurately estimated by the elastic force of vapour, is the absolute amount of moisture in a given quantity of air at the place of observation. Relative humidity, which is that referred to, usually, in weather observations, means the degree of approach to saturation of the air with moisture, and ranges from 0 to 100 per cent., from complete absence of moisture to complete saturation—0 per cent. R. H., never occurs, since even 10 per cent. is of rare occurrence in such arid regions as the deserts of Arabia.

The great significance of humidity is in its relation to the diathermancy of the air and to solar radiation. Dry air would allow the sun's rays of the heat to pass through with, at most, only a slight increase to its temperature therefrom. Let, however, a little aqueous vapour be added, and a partial obstruction to the passage of heat is offered, and the temperature of the mixture, or common air, is sensibly raised. Hence, the less the humidity, other conditions being equal, the more are the effects of radiation felt, the greater is the heat by day and the cold at night. The mere amount of vapour does not determine the degree of radiation, but it is this amount together with the temperature, or in other words absolute and relative humidity taken together determine the heating powr of the sun, and the degree of cold produced by radiation. The great variations of temperature, in 24 hours, in dry climates are the result of low humidity, absolute and relative, and this is why these extremes are of less relative importance than in humid climates at lower level, where they would be much more sensible, and indeed, would be severe. Maximum humidity prevails from midnight to 4 a.m., or when temperature is at its minimum; and minimum humidity about 2 p.m., or when temperature is at its maximum, that is to say, the curve of humidity is inverse or opposite to that of temperature.

It is this factor of humidity in connection with temperature which makes it impossible to get any true conception of climate from a comparison of temperature charts alone. For instance, the annual mean temperature of Toronto is 45° and that of Calgary is 35°, and many people in the East and in England suppose, therefore, that Calgary is the colder climate. How different is the real state of things. Owing to the low humidity, and the greater diathermancy of the air in Calgary, the day temperatures are comparatively high; not only in summer but throughout the winter, and night temperatures low; therefore the mean is lower than in Toronto where the difference in day and night temperature is very much less. Again, situated as it is in the Chinook belt, continually warmed by the mild Chinook winds in winter, so that snow rarely falls more than 2 or 3 inches, remaining only a few days,

and good sleighing can rarely ever be obtained; Calgary has a mild enjoyable winter where cricket and tennis are usually played until January or February; and after a little cold in February and beginning of March, spring begins and by April is often well advanced as evidenced by the green prairie; the ploughing and seeding and the appearance of spring flowers. With strong insolation the days are always warm and pleasant, except for an occasional cold spell after a snow fall, throughout the winter. Although the nights are cold at times in the winter, this is an additional advantage in the summer when the evenings are always cool and bracing and even in the day time a pleasant coolness is always obtainable in the shade. The beauty and vigour of the climate all the year round must be experienced to be appreciated, and they depend on low humidity and quantities of sunshine.

The Chinook wind so often mentioned in connection with the Northwest is a remarkable balmy wind tempering the heat in summer and replacing the cold in winter causing snow and ice to disappear with marvellous rapidity, and licking it up like magic in a few hours. The explanations of the cause of the Chinook have been many, but two only, merit consideration; one, that it blows from over the warm Japanese Gulf stream across British Columbia and the Rockies to Alberta; the other, that it results from the removal of moisture from winds traversing the range as they ascend, leaving them drier and warmer to descend on the Eastern prairie. Moreover it is not necessary to assume that this wind has started from the Western side of the range, since over the Rockies is an area of high pressure in winter, whence, air descending having lost its moisture from condensation, is necessarily dry and warm. This same phenomenon, of a dry warm wind, may often be seen in the neighbourhood of a storm over regions at lower levels, both land and ocean, when moist air in front, after being carried up to rain or snow level and deprived of its moisture, descends drier and warmer on the opposite side of the region of central high pressure. Air may be supposed to have a potential temperature, namely, the temperature which two masses of air in different parts of the atmosphere, having different pressures, temperatures and amounts of moisture, would have, if brought to the same pressure. In an ascending mass of air, from the beginning of condensation of its moisture onwards, the potential temperature steadily increases by reason of the loss of this moisture, but in a descending mass of air the p.t., remains constant at the maximum value attained by it at the highest point in its previous path. This seems the truer and more scientific explanation of the Chinook wind. Whatever its explanation, its quality and its occurrence are very manifest in S. Alberta and its effect on the climate is proved on the range and the cattle as well as on man and his health and spirits.

The general characteristics of climates at sea level and lower altitudes depend on a greater percentage of moisture, higher barometric pressure and higher winter temperature. It is the presence of the moisture which makes the winds so cutting, the cold so perceptible in winter, and it is again the high relative humidity which renders the summer heat so oppressive. Temperature unnoticeable or borne with ease in drier air is exceedingly trying in lower altitudes. It often feels colder at a few degrees below freezing in New York or Montreal than when the thermometer records 10° or 20° below zero in Alberta. Again, in New York or Montreal at a temperature of 80° to 90° in the shade, heat, owing to the humidity, seems unbearable while at the same or higher temperatures in Calgary there is no discomfort. Sunstrokes, heat strokes and thermic fever are of constant occurrence at these temperatures in Eastern provinces, especially in the larger cities, yet, despite the stronger insolation at higher altitudes, sunstroke, etc., are practically unknown. While the Pacific coast, owing to the warm gulf stream which washes its shore, does not have the cold winters of the Atlantic coast, the high humidity of its atmosphere renders it a most unfit climate for the tuberculous patient. There is a high rainfall, and evaporation being slow where humidity is high, there results a long continuance of most oppressive air. At higher altitudes such as Calgary, where the annual rainfall is only one-third or one-fourth of that at the coast, when it does rain the relative humidity is litttle raised, as the dry air admits of very rapid evaporation, aqueous vapour ascends, and the close oppressive feeling of a moisture laden atmosphere is not experienced.

Calgary climate is remarkable for its dry rarified air; quantities of sunshine—since less moisture means less clouds and less rain or snow—and a large proportion of cloudless days. Few are the days in the year when the sun is not in evidence for the greater part of the day, for the most part the sun shines all day long. The results of this climate on the tired worn out tuberculous patients or nervous invalid are wonderful to see, and the rapidity with which they regain physical strength and nervous power, with a corresponding improvement in their mental feelings and outlook, is marvellous.

Dr. P. H. Bryce, in " The Climates and Health Resorts of Canada," says:—" Whatever the physiological explanation, it is certain that the effects of the climatic qualities are to so promote nutrition and reconstruction of tissue that tuberculous cattle transported thereto from the lower levels, and moister climates of old Canada, have rapidly regained flesh and remained for years in seemingly perfect health, while many a consumptive has found that in this climate his disease has been stayed and in not a few instances recovery has taken place. Once let the in-

valid so improve as to be able to ride his broncho over these measureless plains and enjoy the exercise while breathing the rarefied, ozonized air of absolute purity, and his recovery is almost assured. And it is just as certain, and he ought to know it, in order that his cure may be permanent, that continued residence in the climate for perhaps many years is essential, and indeed, in few places can existence become a more real pleasure than in this life of perfect freedom where he is in touch with nature in her everchanging moods."

Apart from its low density and rarefied condition the atmosphere of the Northwest is remarkable for its purity. It contains little organic dust, has a rarity of micro-organisms, and the actinic rays, which exert greater bactericidal powers, are particularly abundant as shown by rapid action of light on photographic plates. While daily winds are common, owing to the rapid change in density from strong insolation and the proximity of regions of high pressure in the Rockies, cyclones, blizzards, etc., are unknown and the winds are never violent or of long duration. Moreover it is to these prevalent winds and the constant change in the atmosphere combined with floods of sunshine, that its remarkable purity is to be ascribed.

The physical results of the above conditions are equally remarkable. Increased respiration, resulting from diminished density, favours development of respiratory muscles and expansion of chest and lungs, leading to hypertrophy of lungs and aiding the healthy lung by complementary enlargement to take over the work of its disabled colleague. Increased respiratory movements aid the circulation of the blood and lymph in the vessels of the thoracic and abdominal cavities. There is an increased heat production and an augmented metabolism rendered necessary by colder air as evidenced by an increased excretion of carbonic acid from the lungs.

Blood counts made at higher altitudes show an increase in red corpuscles, and the objection at first raised—that the difference was owing to an error in the methods used, due to the diminution in barometric pressure, has been shown to be invalid. It is found that with the increase in the numbers of red corpuscles, there is a commensurate increase in the percentage of hæmoglobin. These changes are in early periods of exposure to higher altitude peripheral only, but after animals have been kept there from eight to ten days an augmentation is observable in the number of red corpuscles found in the large arterial trunks. It is due to an increase in the hæmatopoietic activity of the bone marrow. Increased appetite, digestion and nutrition are the constant results of these bracing influences. These bring about increased resistance to the disease, leading to destruction of bacilli and prevention of new invasion,

while further progress of the lesion and further intoxication is opposed. Cicatrisation and ultimate recovery are thus made possible.

Invigorating and health-giving properties of sunlight are soon apparent in people who arrive in the Northwest and take full advantage of the climate. The pallor of the East soon yields to a healthier looking colour, faces become sunburnt and the general appearance assumes that of improved health. Improved tone and nutrition are moreover disclosed in the temperament as well as in the physical appearance. After life under cloudy sky and devitalising influences of humid weather the sun's rays affect, change, and have an important influence upon the physiological processes. Both analytic and synthetic processes go on in the full flood of chemically active light. In short, light is life, though of the exact nature of life we know very little. Modern discoveries are teaching us that the whole interest of nature lies in the perpetual degradation and change that are going on not only in the animal and vegetable but in the mineral kingdom. The very enjoyment and agreeable stimulation which we experience from sunshine are gained at a cost which means the sun's degradation. When that degradation is complete, life, as we understand it, must cease. For aught we know the sun may be a vast mass of radium which in the process of breaking down gives out heat and light—new elements appearing which possess no radio-activity at all. How immense and inexhaustible this energy must be, is well illustrated in the apparent permanence as regards thermo, and photo-activity of even one-thousandth of a grain of radium. Whether the sun's light and heat is a form of radio-activity or not, its beneficial influence is undoubted, and it is one of the most powerful therapeutic agents at our disposal in the treatment of tuberculosis, and the climate having the most sunlight and affording the most opportunities for taking advantage of it all the year round is the best for the tuberculous patient.

SANATORIUM TREATMENT.

The treatment of tuberculosis is now universally recognized to be the building up of the patient's system so that his blood and tissue cells may be stronger than the invading organism and can repair its accompanying conditions or results. This renovation is best attained by the free exhibition, under medical supervision, of open air, food and rest. Fortunately in a number of cases this treatment will bring about arrest and cure anywhere, and so far it may be said that no special climate is necessary. But it is still more true that moist climates with little sunshine and high atmospheric pressure are not so inimical to the disease as a dry, rarefied sun-laden atmosphere, and that for suitable cases such a climate as that of Calgary is essential and may be claimed to be a specific. Since the majority of patients are unable to

leave home or go far away it is fortunate that so much can be done. There always remain a minority who under the best conditions and most approved treatment fail to improve to the desired extent and it is these who, if sent away early enough to higher altitude, to a more stimulating air and sunshine, may yet permanently regain their health and happiness.

In addition there are the well-to-do patients who want the best climate and treatment to be obtained, who want it at once, and who won't be happy until they get it. People, as in the time of Naaman the Syrian, have more faith in going far afield and the mental satisfaction of knowing that the very best climate as well as other treatment is being obtained, has no small part in the process of cure. The good effect of an equable mental condition cannot be overrated. It is often most striking as is also the opposite condition. Pershing reports a case of hæmoptysis due to hysteria, and worry about illness may be more harmful than the disease itself. The baneful effects of worry over genito-urinary, syphilitic complaints, or heart disease, as well as tumours, etc., is well known and applies equally to that under discussion. The mental factor has a powerful effect on the functional dyspepsia so common in phthisis, while bodily relaxation and easy breathing are most useful to nervous patients for the development of that serenity incompatible with the intense emotion which leads to pathological results. We cannot abandon to fanatics and charlatans an agent so powerful for good as the principle of suggestion, but we must use it skilfully and scientifically for the good of the patient and to increase his self-reliance. The personal influence of a physician firm, positive, and tactful, is a powerful sedative which may even be soporific and anæsthetic. In a sanatorium is obtained the desired mental rest and encouragement and as a consequence the best results, provided only that an early diagnosis is made and the patient comes soon under treatment. Under daily supervision he is not so prone to overestimate his strength and improvement and to bring on by unwise exertion the relapse which is so often worse than the primary attack. Gradually trained to such exertion as his strength permits, and advised how much he may do, his progress on the road to health will not be slower but will be sure until at last he is able to resume with safety ordinary life and habits.

After recognition of the disease it is still necessary to carefully select the cases which should be sent even to a moderate altitude such as Calgary, and especially so before sending them to such altitudes as Colorado and New Mexico where at 6,000 to 8,000 feet they often get more harm than good.

UNSUITABLE CASES.

Acute miliary tuberculosis need hardly be mentioned as too severe a form to be aided by removal, and it is inadvisable for any patient to undertake a long journey while suffering from any actute attack, since, after its subsidence a better opinion of the amount of disease and chance of improvement can be given.

Fibroid disease, since, as in advanced emphysema of people over 50 the elastic tissue is destroyed and cannot respond to and expand with stimulation, is not usually benefited by rarefied air. Rapid breaking down is likely to be still further accelerated by altitude, although now and again, improvement has been observed.

Advanced cases, having kidney, intestinal or laryngeal complications do not well bear removal; nor do the cases of nervous irritability with marked tendency to hectic fever and a pulse frequently going over 115.

SUITABLE CASES.

Suitable cases, those which do well and improve rapidly and permanently are:—

1. Those with little more than a tuberculous tendency, the early cases in which, apart from constitutional premonitory symptoms, wasting, anæmia, functional dyspepsia, etc., there are few discoverable signs, little consolidation, little change in breathing, with, perhaps, slight hæmorrhage, the first suspicious sign. These almost invariably do well for altitude seems to have no contra-indication for hæmorrhagic tendency, indeed, on the whole, hæmorrhages are less frequent in the same patients at moderate altitude than at lower levels.

2. Subjects of catarrhal tuberculosis with little consolidation. Among these may be classed the subjects of bronchial catarrh and repeated colds.

3. Those having chronic inflammatory condition limited in extent.

4. Those having a more or less quiescent condition with lung movements limited by pleuritic thickening and adhesions. The lung movements under stimulation of rarefied air will be increased and the adhesions and thickening stretched and lessened.

5. Tuberculosis with nervous asthma in young people whose lungs have not yet lost their elasticity.

6. In addition to pulmonary tuberculosis other forms such as tuberculous glands, bones and joints, as well as children subject to scrofula, tuberculous tonsilitis and dental caries are much benefitted by change of climate.

7. Besides tuberculosis troubles various nervous diseases such as loss of power, nervous exhaustion or neurasthenia, effects of overwork, retarded convalescence, some cases of dyspepsia and hypochondriasis are permanently relieved by climate of higher altitude.

It should be added that those leaving home should do so for a considerable time, since the process of arrest and cure is necessarily slow, and provision should be made for maintenance for at least 12 months—$75 a month is not an excessive estimate for this and little current expenses although many manage with a less sum. It is a common experience that patients suffering from pulmonary tuberculosis who have improved considerably during treatment in a sanatorium, fail to maintain the improvement in health, or even become worse than before when they return too soon to the conditions under which they became ill. It requires a prolonged stay for a case to become entirely quiescent or obsolescent. The outdoor occupation, possible in the Northwest for those whose illness has been contracted in unhealthy surroundings or climate, is another attraction preventing the return to dangerous environment or occupation. To withdraw a man from the town and fit him to live by agriculture or other outdoor employment is to give the best chance of keeping well and robust.

As well as providing for maintenance, sufficient and suitable clothing should be brought along. Flannel or wool underclothing, to protect against the coolness prevailing in the shade at night, is usually the best for all the year round. It need not be very heavy, since this embarrasses breathing and leads to over-heating and perspiration. Above all, the pernicious chamois chest protector, or vest, should be avoided.

For women, short skirts are essential for walking and hill climbing. Heavy skirts should be supported from the shoulder. Waist bands must allow free and easy breathing. One or two cushions will add greatly to comfort. For winter, should be provided a fur coat and one or two warm rugs, that sitting out at any time may not be interfered with.

With these precautions, and so prepared, the climate of Calgary can be enjoyed at all times and will be found equal to any in the world for tuberculosis. The Canadian will find himself among fellow countrymen, and under his own flag, with congenial surroundings. He will, therefore, in every way, have the best chance of regaining his health and strength, and add another to the great number of those who are in themselves the best proof that there is something in climate, especially Calgary climate, which may be regarded as specific in the treatment of tuberculosis.

I have not burdened my paper wth references in its course, but must express my indebtedness to various sources, including Dr. Bryce's "Climates of Canada", S. Cohen's "Climatology", articles on Climate and Meteorology in the British Encyclopædia, as well as various articles in medical publications and journals by Pershing, Earl Bullock, Burney Yeo, Kinghorn, Elliott and others.