Original Articles.

CONDITIONS FAVORABLE TO OUT-OF-DOOR LIFE IN COLORADO.

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OF all the methods that have arisen, of late years, to aid in the arrest, or cure, of Pulmonary Consumption, there has not yet been found one to take the place of change of climate. Even the most ardent advocates of gaseous enemata, of deep inhalations, or of deep injections do not claim for their methods superiority to the climatic treatment, but the most they can urge is that they may be valuable adjuvants, or, at least, that they can be profitably employed, when through financial, or other reasons, a change of climate is impossible. Assuming, then, that the climate is the best treatment known in the arrest, or cure of consumption, or in prophylaxis, the question arises as to which is the best climate. This is a much debated point, and the weight of evidence is often, in the mind of the reader or listener, based upon the esteem in which the one giving utterance to the opinion is held. There are those who contend for a sea air, and others for a mountain air. "Many people," says Dr. Hermann Weber, "still cling to the idea that cold is injurious and warmth curative in phthisis, but this idea is quite incorrect. Another idea, that equable climates are the best in the treatment of phthisis, should likewise be much restricted."

However various the opinions, on two points there is, practically, unanimity:—

(1) That the air should be pure, aseptic, free from germs.

(2) That it should conduce to life out-of-doors.

The former condition, that of an aseptic atmosphere, has been shown by Professor Tyndall, Miguel and others, to belong to elevations of 6,000 feet and over; such an elevation as is to be found along the slopes of the Rocky Mountains, in Colorado, Wyoming and New Mexico.

The conditions that conduce to out-of-door life are those that render life in the open-air not simply tolerable but attractive, so as not only to make the invalid feel that he *ought* to be out-of-doors, but that he *wants* to be. How far these conditions are fulfilled by a life in Colorado, it is my purpose to show.

An important element, perhaps the most important, in making life out-of-doors attractive is that the sun should be shining. Clouds depress, sunshine exhilarates, and between two climates equally good in other respects—if indeed such a thing can be imagined—that one in which the sun shines the most hours in a day and the most days in a year, should be selected for the mental effect—if for none other.

I wish to speak now of sunshine, disregarding, for the present, its effects upon temperature, dryness, (atmospheric and soil), the processes of growth and blood formation, etc. Some years ago¹ I pointed out by the following table that, of the twelve places included in the list, selected with reference to their geographical location, and taking a mean of five years, there were fewer cloudy days in the eastern slopes of the Rocky Mountains than in any other portion of our country.

¹ Science, October 5, 1883.

CLOUDY DAYS. MEAN FOR FIVE YEARS.			
Augusta, Ga.	82	Chicago	107
Jacksonville	87	St. Paul	104
Boston	115	Denver	46
Newport	111	Santa Fe	41
New York	109	Salt Lake	93
Philadelphia	112	Los Angeles	51

The data on which this assertion was based were derived from the Signal Bureau, U. S. A.—and the conclusion I drew was:—"It is seen that, in Denver there is only about one-eighth of the entire year where an invalid would be kept in the house on account of the weather; in Jacksonville and Augusta he would be confined to the house for the same reason, one-quarter of the year; in St. Paul he would be kept indoors between a third and a quarter of the time, while in Boston he would have to be housed a good third of the time."

These facts were questioned, and the methods of deriving them criticised, by the late Edward T. Ely, M. D.,² and the objection was raised that the hours for taking the observations that furnished these figures were 5 A.M., 1 and 9 P.M. (local time) and that the two hours 5 A.M. and 9 P.M., coming at night, were of no interest to the Colorado invalid in estimating the amount of time that he could spend out-of-doors, because of the clearness of the sky.

To meet this objection I compiled the following table, the data being derived from the U. S. Signal Bureau.

CLOUDY DAYS. WINTER, 1884-5.

Months.	Denver Time.			
	9.08, A.M.	1.08, P.M.	5.08, P.M.	All Day, 9 A.M.-5 P.M.
September	2	0	3	0
October	7	2	5	1
November	3	4	6	1
December	11	9	9	1
January	5	5	3	1
February	9	9	5	1
March	4	5	7	3
April	12	5	6	3

The conclusion drawn was:³ "While there occurred days in the winter, under observation, when the sun was not shining at 9 A. M., or at 1 P. M., or at 5 P. M., as the case might be, there were only eleven days in the whole eight months when the heavens were completely obscured at all three observations. In other words, there were only eleven days in the winter of 1884-1885 when the sun did not shine upon Denver between the hours of 9 A. M. and 5 P. M."

The same subject has been represented, diagrammatically, in maps furnished the Colorado State Medical Society by the United States Signal Bureau, at the request of the former. These maps, copies of which, with a reduced scale, I here introduce, are of interest, more as giving the ratios of cloudiness, than because they show the relative amounts of sunshine.

My reasons for making this assertion are that they are compiled from observations taken, the country over, at 7 A. M., 3 and 9 P. M., Washington time, two of the three observations being, practically, for most places, in the night (the corresponding times for the Rocky Mountains region being 5 A. M., 1 and 9 P. M.). Furthermore, in order to show the actual number of hours of sunshine at any given place, a self-recording instrument, of the Draper or other pattern, should be used to jot down the record for every minute of the

² New York Medical Journal, July, 1884.

³ Popular Science Monthly, March, 1886.

day. Such instruments are not introduced into the Signal Service Stations, nor has there been any in operation, in Colorado, until quite recently, when three of the stations of the Colorado Meteorological Association have supplied themselves with them. These three instruments have, however, been in operation too short a time to furnish the required data.

Turning, then, to these maps, it will be seen that, in the spring of 1882, while the highest percentage of cloudiness in the United States was from $\frac{1}{10}$ — $\frac{1}{10}$, in Denver it was from $\frac{1}{10}$ — $\frac{1}{10}$ the minimum being $\frac{1}{10}$ around Yuma.

In the summer of the same year, Denver was $\frac{1}{10}$ — $\frac{1}{10}$, as against a highest $\frac{1}{10}$ — $\frac{1}{10}$, in the East, and a lowest $\frac{1}{10}$ of $\frac{1}{10}$, in lower and Western California. In the autumn, Denver was in the portion of the country freest from clouds, the cloudiness being only $\frac{1}{10}$, and in winter it was still in the least cloudy portion, the cloudiness being only $\frac{1}{10}$.

These maps show that in the autumn and winter months, Denver, which may be taken as standing for Colorado, was in the portion of the whole United States where the sky was least obscured by clouds, while, in the spring, it was about mid-way in the scale.

In considering the amount of sunshine, as influencing the extent to which an invalid can be out-of-doors, it is fair to speak not only of the number of days in a year in which an invalid can enjoy the sunshine, but the number of hours in each day. At present, we can only show this by comparison with other resorts, and by giving the hours of sunrise and sunset.

The much-famed Davos has, according to Dr. Hermann Weber,⁴ on the average, four hours and sixteen minutes per day during November, and four hours and forty-five minutes during January. This is due to its position, being located in a long and narrow valley, where the sun comes over the mountains late, and sets early.

In treating of this subject, Dr. Tucker Wise⁵ gives the following table of sunrise and sunset for the first day of January :

	Sunrise.	Sunset.
Malaja	9.35, A.M.	3.45, P.M.
Wiesen	10.35 "	3.45 "
Pontresnia	8.30 "	3.10 "
St. Moritz	10.00 "	3.05 "
Davos Platz	11.03 "	3.00 "
Andermatt	11.45 "	3.15 "

By way of comparison, I introduce

Denver	7.30, A.M.	4.37, P.M.
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I do not mean to say that what is true of Denver in regard to the hours of sunshine is true of each and every portion of the State; but I do assert that it is true of most of the places of resort, and that the geographical conditions for length of sunshine that exist at most of the resorts of Colorado are beyond comparison with that of most health-resorts, for here the sun rises early over a boundless plain, and rolls on an unobstructed course to a late setting beyond the distant mountains.

Whatever the advantages, then, that come from uninterrupted sunshine — and many claim, amongst the chief of these, an increased production of blood-corpuscles — whatever the advantages that come from uninterrupted sunshine, they are to be enjoyed to the full in Colorado.

Another factor in enticing an invalid to a life out-of-doors is not alone that the sun should be shining, but

that the temperature should be comfortable. It is on this point that the Colorado climate has been most severely criticised by those who are without any personal experience of it, and it has been difficult to carry conviction to the minds of such that the assertions that have been made with respect to the comfort of being out-of-doors at mid-day in the very heart of winter, in this climate, have been true.

We, who have written on the subject, have asserted the facts time and again. We have told of going around, day after day, without overcoats; of sitting with open doors and windows; of sitting out-of-doors in shirt-sleeves; and of picnicking in mid-winter, only to be met with the: "But doesn't the mercury ever go below zero?" "Yes, occasionally it might. "Then it must be cold, where the mercury is below zero." Such persons are not to be blamed, never having experienced the difference, in feeling, between the same temperature in the damp air of the sea-board and the dry air of an elevated region, like that of the Rocky Mountains, they cannot appreciate the truth of Dr. Franklin's⁶ remark that: "Even with a much lower thermometer, the air, if still, feels warmer at an elevated station than in lower and denser regions of the atmosphere, in consequence of the slower abstraction of heat from the body."

This explanation of the "slower abstraction of heat" should be borne in mind in interpreting the figures in the accompanying table, which gives the mean temperature at Denver, Col., for the eight months, September to April, inclusive, at the hours of 9.08 A. M., 1.08 and 5.08 P. M.

MEAN TEMPERATURE, 1884-85.

	9.08, A.M.	1.08, P.M.	5.08, P.M.
September	67.4	75.4	74.6
October	56.2	61.1	64.1
November	41.6	53.3	49.9
December	25.6	32.5	26.8
January	27.0	35.8	33.3
February	31.9	38.0	37.8
March	41.3	48.2	47.7
April	47.7	53.9	54.3

Furthermore, it should be remembered that these temperatures are the readings of a thermometer in the "shelter-box" of the local Signal Station, placed 100 feet or so, above the ground — and, so far as possible removed from the sun's rays and the influence of solar radiation.

This factor, solar radiation, is of great importance in considering the day temperatures of Colorado; one that can be explained by figures, but not thoroughly understood, save from personal experience. Says Prof. Edward Franklin, M. D., F. R. S., whom I have already quoted: —

"The sun's rays are far more powerful at great, than at low elevations, and their intensity is much more equable throughout the day."

It is the *intensity* of the sun's rays, added to the *slower abstraction of heat* from the bodies that makes the day temperatures of Colorado enticing to an invalid for an out-of-door life; that makes it possible to sit with doors and windows open, and to picnic even in the middle of winter.

Not until recently have we been able to give figures in corroboration of our assertions, but for a year or more, the Colorado Meteorological Association has been taking observations with a solar thermometer (a blackened-bulb thermometer *in vacuo*) placed at the same elevation as the signal thermometer from which the

⁴ Croonian Lectures, 1885, p. 83.

⁵ "The Alpine Winter Cure," p. 68.

⁶ Popular Science Monthly, July, 1885.

Mean Cloudiness, in tenths. Spring, 1882.

Mean Cloudiness, in tenths. Autumn, 1882.

Mean Cloudiness, in tenths. Summer, 1882.

Mean Cloudiness, in tenths. Winter, 1882.

readings given above, were taken, and exposed to the same surroundings save that the one is in a "shelter-box" and the other is exposed to the direct rays of the sun. The following table is a summary of results for the 1 P. M. reading for the year 1886.

MEAN TEMPERATURE. 1 P.M.				
1886.	Solar.	Air.	Difference.	
January	92.5	27.3	65.2	
February	106.3	48.0	58.3	
March	107.8	41.1	66.7	
April	110.6	52.3	58.3	
May	141.3	74.3	67.0	
June	142.2	75.1	67.1	
July	146.5	85.2	61.3	
August	143.7	81.5	62.2	
September	132.3	72.0	60.3	
October	119.5	64.2	55.3	
November	100.0	41.3	58.7	
December	100.2	45.5	54.7	

It should not be necessary for me to go into an explanation of these figures. They prove conclusively that it is possible for one to be around in the sunshine of the noon hours, even in mid-winter, without an overcoat; that it is possible to sit out-of-doors, *in the sun*, even in December, or January, or February, without being chilled.

The sensation is most novel and exhilarating. A sun-temperature of great intensity beating down upon one while he is constantly being bathed with the refreshing coolness of the air. I cannot describe it! One can theorize about results as he may please. He may say that the extremes between the air temperature and the sun temperature must be injurious and not to be borne.

I know, and every one of the thousands of inhabitants of Colorado knows, that, far from being injurious, it is most salutary; that it renders life out-of-doors wonderfully attractive; that one goes swinging along, in mid-winter, unimpeded by unnecessary wraps, with a step of bouyancy and a feeling of intense exhilaration.

With these factors of which I have spoken, a large percentage of sunshine, and a temperature of sufficient warmth to do away with over-coatings and wraps, what life does not open to our invalid!

Be he quite delicate, he can sit in a sequestered nook, away from draughts and winds, and bathe for hours in the genial warmth of a hot sun, while he is breathing an aseptic, dry, rare air. Be he more vigorous, he could do as is most common with our invalids, he can ride or drive, he can play croquet, tennis, or what not, — in short, he can be out-of-doors, almost constantly from sunrise to sunset and be pleasantly occupied the while.

It may be that in making these assertions I am forestalling things that should first have been said. Life in the air would not be so enticing were there rain, or snow, or fog. To be sure, it can hardly be true that there will be much rain, or snow, or fog where there is so much sunshine; yet to clear up any doubt and to state the matter positively I introduce the following table giving the total amount, in inches, of rain or snow (melted) that fell each month of the year 1886.

PRECIPITATION, 1886.			
January	0.62	July	0.50
February	0.72	August	0.72
March	2.36	September	1.68
April	2.73	October	0.33
May	0.09	November	1.93
June	2.26	December	0.87
Total	14.87		

I will further state, that having had occasion to investigate the subject, some time since, I found that

there was *not a single fog* recorded at our signal station during the months September to April inclusive, in 1884-85, as occurring between the hours of 9 A.M., and 5 P.M. Fogs do occur, but so rarely as almost to warrant the assertion that such a thing does not exist in Colorado.

One more factor I wish to speak of as favorable to out-of-door life in Colorado, and in this connection I may say that here, as in all else I have said, I make especial reference to the months that constitute an invalid's winter. September to April inclusive — and that is that this life out-of-doors is led on a dry, sandy, porous soil, free, almost the entire time, from any covering of snow and absolutely dry.⁷ It is not my object to speak of soil-moisture in its relation to the production of consumption, a subject so ably treated of by Drs. Bowditch and Buchanan, but rather to urge the advantage to be derived from being out-of-doors on an absolutely dry, sandy, soil.

How could our invalids lead the life they do were there snow and ice on the ground? Horseback riding would be impossible, and this constitutes the chief exercise of our invalid population, and even driving would be uncomfortable. I say would be, because sleighing is a condition of things nearly unknown in Colorado. When snow falls, as it sometimes does, to the extent of fourteen inches or so, the intense solar heat, and warm winds soon melt it, and the porous soil soon drinks it up, and like Aladdin's palace it is gone. Of course this freedom from snow does away with wet feet, so common when there is snow, and with the inevitable and distressing "thaw."

The advocates of ice-and-snow-covered soils, such as exists in the Engadine in winter, trace its advantages to two sources; namely,

(1) It prevents dust and decay, and the microbe-laden evacuations from the soil (Hermann Weber).

(2) It influences the sun-temperatures by reflecting the solar rays from the snow (Franklin).

To show how unimportant this latter factor becomes, I quote figures from observations taken in the "Maloja," by Dr. A. Tucker Wise, and compare them with my own, already introduced.

MEAN SOLAR RADIATION.			
Maloja.	Fahr.	Denver, 1 P.M.	Fahr.
November, 1883	113	November, 1886	100.0
December, 1883	89	December, 1886	100.2
January, 1884	105	January, 1886	92.5
February, 1884	108	February, 1886	106.3
Average	103.75	Average	99.75

In regard to the prevention of dust and decay and microbe-laden emanations from the soil, chapters might be written. It might be asked, for instance, whether decay and microbe-laden emanations will not be produced to an exaggerated degree by the thawing of the ice and snow that have kept them dormant for months; and whether this thaw will not come at these resorts at times when they should be especially in demand, because of the inclemency of the weather at the invalid's home.

The microbe-laden emanations are also the results of putrefaction, and can hardly be applicable to the vast extent of mountains, or the boundless plains, where there is but little animal or vegetable matter to decompose. In communities the prevention of these emanations must be a matter of sanitation.

⁷ This is not always true of Denver, where the soil is more alluvial and is sometimes muddy, but it is true of the State at large, and especially of such places as Colorado Springs, Poncha Springs, Boulder, Idaho Springs, etc.

Perhaps the heaviest charge to be laid at our door as regards the prevention of out-of-door life, is the question of winds. While the average daily velocity in miles at Denver, is much less than in Boston, as is shown by the following table, yet it sometimes happens that we have high winds, which, in a city like Denver, where the streets are not paved and there is no snow upon the ground, picks up the dust and makes a so-called "dust-storm."

VELOCITY OF WIND, 1880.

	Spring.	Summer.	Autumn.	Winter.
Boston	257	184	223	281
Denver	156	143	115	127

In places like Colorado Springs, Boulder, Idaho Springs, Poncha Springs, etc., where the soil is more gravelly and where there are not any narrow streets, through which the wind can sweep, as through a funnel, dust-storms are infrequent. Even in Denver the days in which there was a wind of eighteen miles, or over, for two consecutive observations of the three, 9 A.M., 1 and 5 P.M., during the year 1886, were as follows:

HIGH-WINDS, 1886.

January	1	July	0
February	5	August	1
March	1	September	1
April	1	October	3
May	2	November	6
June	0	December	2

There were, in addition, about an equal number of times when there was a wind, of eighteen miles or over, at only one of the three observations.

These figures, I know, can carry but little idea, for unless one is acquainted with the methods of taking observations the simple statement that a wind is blowing eighteen miles an hour does not convey much information. It is nothing like a tornado, and perhaps should not be called a high wind. Many would speak of it as a pretty stiff breeze.

In mentioning the aseptic air, the clear weather, warm sun, dry soil, freedom from fogs, etc., as amongst the attractions that conduce to life out-of-doors in Colorado, I must not forget to add to them the vast number of natural objects that awaken interest and excite the curiosity.

There are mountains, and dells, and caves, and cañons to be explored; remarkable and grotesque formations in rock to be visited; an almost unknown Flora and Fauna to be studied, and upheavals and wonderful geological formations to be noted. There are mountains, on the one hand, with all the attractive features of life amongst the eternal hills, and plains close by to be roamed over at will, as one drifts about over the rolling sea.

Space will not permit of my going into detail, the guide-books and other writings are full of descriptions; and so I will draw what I have to say about the attractions to an out-of-door life in Colorado, to a close, by quoting from a remarkably impartial article written by the late Dr. Ely, who, himself an invalid, kept close observation of the weather of Colorado Springs. "From the 1st of September (1883) to the 1st of May (1884)" he writes: "I have been confined to the house by bad weather forty-two days—that is, there have been forty-two days (out of two hundred and forty-two) on which I have not been able to go out even one hour, and such may be fairly reckoned as days indoors. Of the remaining days there have been many when I should only be out from two to four hours,

and when being out was a burden to the flesh. This record is satisfactory enough for me."

He then concludes his article as follows: "Colorado can easily afford to rest on its own merits, which are indisputable, and is only injured by much of the indiscreet praise bestowed upon it by its friends. Despite all objections which may be raised, the climate is, probably, as we have already said, the very best of its kind at present available for invalids, and destined to grow in popularity as its merits become more accurately understood."

ATYPICAL TYPHOID FEVER, WITH REPORT OF A CASE.

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THE typical or common form of this disease is too familiar to require any description in this article. The report, however, of a case in which the temperature during most of the patient's illness was subnormal, may be of interest.

In a lecture on the subject by James C. Wilson, M.D.,¹ at the Philadelphia Hospital, he divided the atypical forms into the following classes; namely,

(a) Mild typhoid; (b) abortive typhoid; (c) typhoid of childhood (infantile remittent); (d) typhoid of the aged; (e) cases of febrile intestinal catarrh; (f) cases of afebrile intestinal catarrh. It is to this last and rare form that I would direct attention.

The writer was called on the 20th of April, 1886, to see a child ten years of age who had been unwell for several days. His tongue was slightly coated, bowels constipated. Pulse 100, temperature 100°, under the tongue when it was taken at each examination. At this visit he was given a dose of calomel and bismuth, and a Dover's powder left to be taken at bedtime. The calomel produced several free evacuations from his bowels during the night.

On the afternoon of the next day there was little change in his condition, his headache had not abated, pulse 100, temperature 101°. He was ordered a fever mixture. The next afternoon his pulse and temperature were 110 and 102.2° respectively. A milk diet was ordered. On the 24th there was no headache, but the pulse was 118, temperature 103.5°. No tympanites, but marked tenderness in the region of the ileo-cæcal valve. The case was pronounced one of typhoid fever, and the patient put upon the so-called "specific treatment" of carbolic acid and tincture of iodine, which caused so much nausea, however, that, after a few days it was discontinued, and the previous fever mixture was resumed.

On the afternoon of the 26th, the patient seemed worse. He would answer questions very slowly; his abdomen was slightly tympanitic and tender on pressure, pulse 118, temperature 101°. It will be noted that the temperature fell 2.5° on the seventh day of treatment, and about the tenth day of his illness. As he had not been overwhelmed with quinine or antipyrine, it could hardly have been the result of treatment. On the 27th, a moderate diarrhoea set in, with pulse 120, temperature 99°; in all other respects the condition was unaltered. There was no change on the 28th, but on the 29th the tympanites had increased, and blood appeared in the discharges; pulse 124, temperature 98°. For six days, until May 5th, there

¹ Medical News and Abstract, July, 1881.