tonsils, fauces, larynx, and bronchial tubes become rife—quite epidemic; and yet these are the atmospheric conditions said to be all but permanent at Davos. On the Mediterranean shores, the last winter was an exceptional one in this respect. Frequent south winds tempered and modified the north winds; the sky was often covered with unusual clouds; the air was less dry; more rain fell; the nights were warmer. The visitors complained; but we, the physicians, did not. The winter was an exceptionally healthy one; there were very few catarrhal affections, no catarrhal epidemic. I myself, for the first time in twenty years, got through the winter without the slightest cold. I find my experience at Mentone confirmed by that of Dr. Marcet at Cannes, as contained in a recent valuable memoir in the BRITISH MEDICAL JOURNAL.

Dr. Clifford Allbutt, in a series of interesting papers, which have also recently appeared in the *Lancet*, attributes great importance to the antiseptic character of mountain-air, as evidenced by the subsidence of hectic fever produced by the absorption of the purulent products of the disease in the lungs. This same subsidence of hectic is constantly observed with us in the Mediterranean, provided the patients ventilate freely; not if they do not ventilate. If it be an antiseptic phenomenon, the proximity of the sea must impress the same characteristic on atmosphere—must equally deprive it of morbid germs. In all probability, however, free ventilation night and day would produce the same result anywhere.

The cases published by Dr. Clifford Allbutt and others—those from Danvers, Colorado, and St. Paul's, Minnesota, in the United States—triumphantly prove that consumption may get better in the coldest regions and climates, provided the sufferers throw aside vain theoretical fears and live hygienically, in the open air as much as possible. In this respect, they are valuable contributions to the therapeutics of phthisis. On the other hand, they by no means prove that such climates—climates in which twenty hours or more of the twenty-four must be passed, in the finest weather, in stove-heated rooms—are the best for consumptives; that they exercise a positive and exceptional curative influence on phthisis. We must also remember that, both in Europe and in America, it is the picked cases that are sent to the higher mountain-elevations in winter.

In conclusion, I would again draw forcible attention to the fact that pulmonary consumption, although a mere mode of dying to many, perhaps to most, may be recovered from anywhere in northern and temperate regions, either with or without treatment, as proved by the *post mortem* examination of the aged, and by the general experience of the profession. Phthisis also, except in the acute and subacute forms, is essentially a chronic disease, frequently taking some years to run its course even without treatment, and still more frequently so with rational treatment. Moreover, it is a disease which progresses naturally *per saltum*, as it were. It has periods of lull, of arrest, which do not imply eventual cure, and must not be mistaken for such. These periods of temporary lull may, it is now thoroughly proved, occur anywhere in temperate or cold climates—in Paris or in London, at Mentone or at Madeira, at Davos or at St. Paul's. This fact has been abundantly established; but it is a very different thing to claim for the extreme climates pre-eminence over the temperate ones. It will require a great deal of evidence to establish this as a fact; and so far the evidence, as detailed in this essay, seems to be antagonistic to such claims.

It appears to me that if we are guided by the laws of physiology, by those of general pathology, and by the meteorological facts brought from the mountain plains of central or tropical America, we are warranted in concluding that for Europeans the north shores of the Mediterranean offer the best attainable climates in winter. They constitute the nearest attainable approach to the American mountain plains, and admit of life being spent, as there, in the open air in the day, as also of free ventilation at night. I do not, however, believe that those regions exercise any specific curative influence on the disease. They merely act by improving the general health, by restoring nutritive power, and arousing general vitality. For all this to be accomplished the patient must be obedient to medical guidance, and surround himself with pure air day and night. If he does not do so, he usually dies, and, generally speaking, as rapidly as he would in London or in Paris.

Quito is a long, long way from us, or we might rationally make it a sanatorium for consumption. There is the Atlantic to cross, as also the Isthmus of Panama, a Pacific Ocean navigation; and when Guayaquil is reached there is still eight days' arduous travelling in the mountain in a palanquin, and all kinds of hardship to encounter on the road. Mexico is easier of access, but still not to be reached without great trouble, risk, and expense.

For summer, Alpine elevations in Europe are no doubt an immense improvement on the heated plains and cities of continental Europe, and

it is easy to understand the rush made to them by the Germans and Swiss, but are they superior in climate and health advantages to the cool breezy shores and hills of Great Britain for invalids? I much doubt it. Even on the natives, mountain elevations in Europe, according to Dr. Lombard, are not altogether good, producing in the Alps and Pyrenees diminution of stature and often idiocy, cretism, goitre.

I have myself noticed repeatedly that at great elevations in the Alps the conditions even in summer are not favourable to health or to those suffering from chest affections. Owing to the dryness and clearness of the atmosphere, when the weather is fine, not only is the heat of the sun intense, but the atmosphere itself is warm. Last year I was at the comfortable hotel at Murren, near Lauterbrunnen, 5,500 high, on the 15th of July, on a lovely cloudless day, and found the thermometer in the shade 80° Fahr. at two o'clock. The sun was fierce and broiling, whilst at and after sunset at these altitudes, the nights are very cold. Whenever the weather is damp and rainy in the Alps at two, three, or more thousand feet, there are constantly clouds hanging on the mountain sides or ascending the valleys. These clouds are merely cold damp fog. Often there is snow in midsummer. These are not conditions favourable to health.

THE WINTER CLIMATE OF DAVOS PLATZ.*

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THE valley of Davos lies in the Grisons, between the Lower Rhine and Upper Engadine valleys, and runs N.N.W. and S.S.E., being well sheltered on each side by lofty mountains, and is ten miles in length and one-third of a mile to half a mile in breadth, widening towards the south. Davos Platz, the sanatorium, stands 5,103 feet above the sea-level. Meteorological observations have been taken for four successive winter seasons by the Rev. Francis Redford, Mr. Guntery, and Mr. and Mrs. McMorland; and of the many interesting climatic records kept the following is a summary.

The barometric pressure varies from 24.62 inches to 25.02.

The thermometric observations give a mean temperature for the winter months, based on four years, of 28.1° Fahr. The mean for each year is as follows: for 1876-77, 30.6° Fahr.; for 1877-78, 28.3° Fahr.; for 1878-79, 26.3° Fahr.; for 1879-80, 27.3° Fahr. The maxima range from 75° Fahr., registered in October 1876, to 12.5° Fahr. in December 1878; the mean maximum of the four years being 39° Fahr. The minima range from 43.1° Fahr. in October 1876, down to -16.7° Fahr. in December 1879; the mean minimum for the four years being 17.3° Fahr. The maxima only exceeded 60° Fahr. on eight days during last winter, and fell below 20° Fahr. on thirteen days. The minima fell below 0° Fahr. on seven days in 1876-7, on eleven days in each of the winters 1877-8 and 1878-9, and on fifteen days in last winter.

The black bulb *in vacuo* thermometer yielded the following extraordinary results of solar radiation in this mountain climate, giving a total mean of 114.4° Fahr. In 1876-77, the mean was 114.8° Fahr.; in 1877-78, 111.4° Fahr.; in 1878-79, 113.4° Fahr.; and in 1879-80, 118° Fahr. The maximum was 166° Fahr., in February 1879. The sun's rays are so powerful that, by placing black cloth behind the solar maximum thermometer, a temperature sufficiently high to boil water has been attained; but Dr. Frankland is of opinion that this permeability of the atmosphere to solar radiation does not increase with altitude, as the same results were obtained at the Fluela Pass, 2,700 feet above Davos, the thermometer not marking higher records. Tanning and browning of the skin is a result of this radiation.

The percentage of humidity varies from 72 to 62, the last two winters giving 63 and 62 respectively, indicating a very dry state of the atmosphere. Last January was a particularly dry month, the percentage falling to 40° Fahr. The number of days on which rain or snow fell during the three winters varies from forty-three to fifty-seven per winter, and the rest of the days were for the most part sunshiny. Last winter numbered one hundred and ten fine days, thirty cloudy, and forty-three wet or snowy. As may be concluded from the temperatures, but little moisture fell in form of rain, and nearly all as snow; and when snow falls, owing to the dryness and low temperature, it does not cling to the clothes—consequently invalids often go out in the snow with impunity. During the last winter there were few days on which outdoor exercise could not be taken, and in most seasons at least two-thirds of the days can be counted on for walks or drives. The prevalent winds are the north, north-east, and south-west; the latter, or *Föhn*, is most dreaded, on account of its melting the snow, and thus disturbing the winter conditions of equilibrium of climate. Wind, however, is very slight in force, and the general state of atmosphere is that of calm, or the low temperatures would be unendurable.

* Abstract of a paper read at the Meteorological Society, June 16th, 1880.

The effects of the Davos climate appear to be due to—1. The rarefaction of the atmosphere; 2. Its dryness; 3. The absence of wind, partly owing to the shelter of the mountains, and partly to the uniform layer of snow spread around; 4. The large amount of sun's rays transmitted through the rarefied atmosphere, as reflected on to the village from the extensive snow-plain lying to the east of it.

THE WATERING-PLACES OF THE AUVERGNE: THE MONT DORE.

By A. RABAGLIATI, M.A., M.D.,

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THE old district of the Auvergne (Arverni of Cæsar) contained the department of the Puy de Dôme, in which are found all the principal watering-places of this part of France, with the exception of Vichy and places like Cusset, etc., in its immediate neighbourhood. Vichy is so well known that I do not propose to describe it afresh, though I visited all the springs there, and inspected the "Establishment" and the baths. The part of the Puy de Dôme containing the springs is a volcanic country full of hills, showing often on one side basaltic columns or jagged peaks, with sharp ridges, and on the other sloping more gradually, so as to be tolerably easy of ascent from this side and almost impossible from that. Some of these mountains are between five and six thousand feet above the sea-level; while the Pic de Sancy, the highest of them, is over six thousand feet. The scenery is, therefore, very fine, being composed of varied hills and dales, rushing torrents, solitary, lofty, and imposing rocks, often showing remains of Roman or even pre-Roman times; green valleys smiling with hay or corn; the hill-sides in warm places being covered with vineyards, and responding plentifully to spade-culture; in others being planted with firs (mostly spruce), and beech-trees and hazels abounding on the roadside. In the lower parts, walnuts, chestnuts, and pollard poplars, with, of course, the acacia, common all over France, grow plentifully. Even if there were no other hygienic or sanitary attractions than those which such a varied country affords, it would probably be visited on account of its natural beauties, though the French are not so country-loving a people as the English. It is, however, to its springs that this district owes its great fame and the fortunes of its inhabitants. These springs jet out of the rocks all over the district, but most abundantly in a part of the country forming an irregular quadrilateral, and bounded on the north by a line joining Chateaufort and Rouzat; on the east, by a line passing from Rouzat through Chatelguyon, Clermont-Royat, and St. Nectaire; on the south, by a line passing through the Mont Dore from St. Nectaire to La Bourboule; and on the west, by a line joining La Bourboule and Chateaufort, and passing, in its course from north to south, through a large number of small places with one or two springs each, which have served to name the spots, such as Javel, Chateaufort, Pranat, Bourdeilles, etc. Except Clermont, not one of these places is accessible by railway (though one is in course of construction to the Mont Dore); and this no doubt adds to their charm as rustic retreats from the noise of cities and the cares of business. Many of them, if not most, were known to the Romans; such, for example, as the special subject of this letter—the Mont Dore—where, in the public "parc", any visitor may convince himself of the reality of this fact, and bring himself into much closer relation with that remarkable people, by examining the broken columns, carvings, and massive building-stones, disinterred about sixty years ago by the energy of Dr. Michel Bertrand, the recreator of the place. Still more interesting and realistic, if possible, is the appearance of some of the springs; such, for example, as that of "Rigny", at the Mont Dore, where the well is actually now in the very condition in which it was left by the Romans, not a new brick or trowel of mortar having been required to repair the well-done work which they have left us as their memorial. It is exceedingly curious, in human affairs, to note how similar conditions evoke similar necessities in life; and we are struck by the necessity felt by the Romans to get away from the noise and stir of their cities, and particularly from the toilsome energy of their employment, to quiet country watering-places, there to find, in retirement from the pressure of affairs, that rest which they found indispensable to brace them up to fresh endeavour on their return. That it was not merely city life, but labour, which necessitated these diversions, is evident from what took place in the Middle Ages, when, though cities survived, watering-places did not, the record of nearly all of them having disappeared or been forgotten, till, as in the present case, the recurrence of the old conditions raised again a demand for fresh sources of invigoration, and many of the old haunts were rediscovered. So completely do those overlook the necessities of our nature who preach of patient labour, and imagine that patient continuous labour is possible without at least one annual holi-

day and change of scene! Medical men, who can see this so plainly in the case of their patients, are particularly apt to imagine that in their own case it does not matter; and they may be found jogging on year after year, till some illness sharply reminds them of their error, too late often to profit by the instruction. But this by the way.

The valley of the Mont Dore runs north and south from the Puy Gros, a high hill which shuts it in at the former end, to the Pic de Sancy, which forms the southern boundary. On the east, the village is protected, as by a wall, by the *plateau de l'angle*; and the valley opens out to the west, though scarcely enough to let the sun warm it sufficiently, in the direction of the *Capucin* hill. This hill is so called because of its likeness to a monk's head. It rises some 4,500 feet above the sea-level, though only about 1,000 above the village, which has, therefore, a very considerable elevation. Owing to this cause, sojourners at the Mont Dore are apt to suffer from the cold winds which come down from the hills in the mornings and evenings, and which form a source of danger not by any means to be overlooked by those who go there suffering from chest-affections. Notwithstanding this drawback, the place is generally very hot in the summer months, and the temperature is said to average 63° Fahr. in July and August. My experience was less favourable, owing to the cold and wet which prevailed all last year; and very often we had to shut ourselves up in the hotel and sit round the wood fire in the *salon*, just as in cold weather in England, or to use a *chauffrette* or foot-warmer in our bedrooms. Evidently the visitor cannot absolutely count on fine weather, though it appears, from the testimony both of residents and of visitors, that the season of 1879 has been quite exceptional, and unparalleled for wet and cold. According to M. Hertz, "the elevated region of country between 2,500 and 6,500 feet is the proper dwelling-place for the phthisical in summer", and it is for its power over phthisis and bronchitis that the Mont Dore is chiefly famous. I propose, therefore, to describe, in its practical and theoretical aspects, the treatment to which sufferers from these disorders are subjected; and perhaps the best method of doing so will be to give an account of the waters and the method of their application.

The bathing establishment is fed by four principal springs, and the water used for bottling and exportation is obtained from a fifth. These are all hot springs; but there is besides another, a cold one—Sainte Marguerite—whose water is much used as a table-drink. The chief springs are: 1. That of the Madeleine, now called the Source Bertrand, after the restorer of the place; the temperature of this spring is 113° Fahr., and the delivery 140 litres a minute; 2. The Source du Pavillon, or Saint Jean, temperature 104° to 110° Fahr.; delivery about 49 litres a minute; 3. The springs César and Caroline; the temperature about the same as the last, and delivering about 80 litres a minute; 4. Two small springs, Ramond and Rigny. The composition of these springs is thus given by Jules Lefort, 1862.

	Source de la Madeleine.	Source du Pavillon.	Source Rigny.	Source César.	Source Ramond.
	<i>Grammes.</i>	<i>Grms.</i>	<i>Grms.</i>	<i>Grms.</i>	<i>Grms.</i>
Oxygen	0.65	0.77	0.71	0.98	0.73
Nitrogen	8.64	10.45	9.25	14.22	10.01
Free carbonic acid	0.3522	0.3840	0.3644	0.5067	0.4997
Bicarbonate of soda	0.5362	0.5452	0.5375	0.5361	0.5362
" of potassium	0.0309	0.0309	0.0232	0.0212	0.0212
" of oxd. of rubidium	Traces	Traces	Traces	Traces	Traces
" of cesium	Traces	Traces	Traces	Traces	Traces
" of lithia	Traces	Traces	Traces	Traces	Traces
" of chalk	0.3423	0.3142	0.3092	0.3209	0.2720
" of magnesia	0.1757	0.1676	0.1628	0.1676	0.1647
" of protoxide of iron	0.0207	0.0235	0.0250	0.0258	0.0317
" of manganese	Traces	Traces	Traces	Traces	Traces
Chloride of sodium	0.3685	0.3630	0.3599	0.3587	0.3578
Sulphate of soda	0.0761	0.0761	0.0761	0.0761	0.0761
Arsenate of soda	0.00096	0.00096	0.00096	0.00096	0.00096
Borate of soda	Traces	Traces	Traces	Traces	Traces
Iodide and fluoride of sodium	Traces	Traces	Traces	Traces	Traces
Silicic acid	0.1654	0.1686	0.1653	0.1552	0.1560
Aluminium	0.0112	0.0094	0.0101	0.0083	0.0065
Bituminous organic matter	Traces	Traces	Traces	Traces	Traces
Totals	2.08016	2.07776	3.03546	2.26736	2.11946

I have given this table as it appears in the works of two French authorities—one of whom refers to vol. viii, 1862, of the *Annals of the Society of Hydrology*. Both have evidently copied from the same source; but, unfortunately, in neither case do the figures bear examination, as any one may see for himself on attempting to add them up. Probably there are errors in the original, and I suppose these are due to the misplacing of the decimal point; but though I have made several attempts to rectify the figures by altering the point, I have not succeeded. It is difficult to imagine how two men of eminence could copy, without question, figures so manifestly erroneous; but many men seem to lose themselves in the *terra incognita* of arithmetic. I believe the totals are correct, although the individual factors are not so.