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Climate, Health, And Disease;

An Essay.

By

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Preface.

In the following pages I have attempted to illustrate the Influence of Climate upon Disease, both as originating it and curing, or, at least, alleviating it. I think it cannot be doubted but that this is a topic well worthy of philosophical consideration. It may be said, indeed, to be a branch of Medical Philosophy; and, perhaps, I am not too sanguine in hoping that its investigation by future physicians will tend to open up to our knowledge some novel but valuable agencies in prolonging Human Life. I have not ventured to pursue to any great extent the conclusions on the Sanative Influence of Climate which I myself have arrived at. It is only for the great Masters in the Art to found their systems upon the data which Experience furnishes. I have but dared to take up their reasonings and their dicta, and have sought to present - of these - a clear, concise and intelligible synopsis, so that the reader may in the compass of a few pages, obtain the result of the labours of our best-esteemed physicians. I have, therefore, liberally availed myself of the works of Hippocrates - Malte-Brun - Clarke - Traill - Laycock - King - Lempriere - Martin - Maury - Heygham, and many others; the substance of whose valuable observations will be found in this little volume. To the Examining Body of the University of Edinburgh I respectfully submit my little manual, in the hope it may secure from them that favourable notice and honourable eulogium which are the crowning distinctions of the Students career. Their approval I shall know how to value, as the kindness of those among them who have directed my studies, I shall know how to treasure among the most precious memories of my Student-life.

R. C. J.

March, 1857.

"Nullum numen abest- si sit- prudentia; sed te
Nos facimus Fortuna deam, coeloque locamus"

'Horace'.

"Quatenus nobis denegatur, dii, vivere velimus aliquid
quo nos vixisse testamur".

'Plin: Epist', Lib. IV. Epist: 7.

Part I.

The mental organization of Man is so dependent upon the physical; "he is so fearfully and wonderfully made"; his intellectual faculties are so closely connected with his corporeal; the mind, the will, the impulse, the emotion are all so easily affected by external causes; it cannot be a matter of astonishment that he should sedulously investigate the principles of Medical Science for the purpose of preventing, if possible, or, at least, of mitigating any serious derangement of his physical system. It is now generally acknowledged that the state of the mind is correlative with the state of the body; the one can scarcely be affected without the other. "Mens Sana in Corpore Sano", was merely the prayer of the wise man of antiquity. It is now an acknowledged axiom in Medical Science. A careful attention to our physical condition, to the healthy play of the lungs, to the equable circulation of the blood, to the due performance of the various secretions, is therefore incumbent upon us, if we seek to enjoy the free use of our mental powers. A due consideration of our bodily health is not a mere vulgar selfishness or ridiculous timidity. It is the effect of a legitimate desire to employ our intellect to the best advantage. We cannot be useful to others, we cannot minister to our own rational

enjoyments, without a sound body - the "Sano corpore", which brings with it the "Sana mens" - the sound mind.

Delicate as is the organization of man, both mentally and physically, it is obvious that he will be liable to be affected by a thousand external influences. Amongst these one of the most important, though until late years one of the least considered, is climate. To a certain extent we are the creatures of climate. Not only does it affect the individual, but the race. It moulds communities, colours their laws, morals and manners. Climate has made the Asiatic what he is. Climate has bred the hardy Northman, whose stalwart Saxon descendants are virtually the rulers of the world. Take the Indian, whose blood is heated by a tropical sun: how different his passions, thoughts, hopes, desires from those of the Greenlander who dwells amid eternal snows! Consider how the American temperament is affected by his warmer skies and greater vicissitudes of climate, and contrast it with that of the Englishman from whose fathers he is himself descended. Again, "the liveliness of the Frenchman differs from the sedateness of the German: and the proverbial dullness of the Dutch differs as much from the energy and vivacity of the Italians". And, lastly, we witness its effects in a much more distressing manner, when we behold those creatures - who exhibit the human form in its lowest and most repulsive type - the Cretin. Such being

the influence of climate upon races, it is reasonable to suppose that it will operate in a similar manner upon individuals; and it is my object in this treatise to investigate how it operates in the prevention, cure and production of disease.

How climate acts, it is perhaps almost impossible to determine. "When we study the organic life of plants and animals", says Humboldt, "we must examine all the stimuli or external agents which modify their vital actions. The ratios of the mean temperatures of the months are not sufficient to characterize the climate. Its influence combines the simultaneous action of all physical causes; and it depends on heat, humidity, light, the electrical tension of vapours, and the variable pressure of the atmosphere". Climate, therefore, may operate in known and unknown ways. The fact of its operation is undoubted; the manner of its operation we can only guess at. So important is the subject, however, that it is well worthy of greater attention than it has yet received; and it might possibly be rendered a more effectual agency in the cure of Disease than has yet been supposed.

It cannot be doubted but that the variableness of the English climate is a cause of those pulmonary affections to which the English are peculiarly liable. To a similar cause, Sir James Clark, in his valuable work "On the Influence of Climate", ascribes, "scrofulous affections; rheumatism; disorders of the digestive organs; hypochondriasis; and

a numerous train of nervous disorders". Many of the dis-
=eases may be considerably alleviated by a change of climate;
just as the jaded merchant gains a fresh stock of healthy
energy by his removal on the Saturday afternoon from the
stifling city to the fresh, breezy air of the country. It
is not unreasonable to suppose that Climate may act still
more beneficially. An Englishman, springing from a family
hereditarily affected with consumption, might possibly in his
own case escape the disease, if in early youth removed to a
warmer and more genial air. The great improvement in
the Sanitary conditions of the inhabitants of London, visible
with each succeeding year, may with propriety be ascribed to
the increase that has taken place in Rural Excursions, and
to the facilities offered by Steamers and Railways for a complete
change of air. The exhausted body and wearied mind obtain,
at frequent intervals, repose, recreation, the fresh breeze, and
the advantages of a change of climate. More attention,
too, is paid now-a-days to the <u>climate within doors</u>. Care
is taken to obtain a good ventilation and a pure atmosphere.
The continued change of air thus enjoyed, braces the physical
and renews the mental energies.

Climate is affected by numerous external influences, which
it is necessary the medical man should take into consideration when
about to recommend to an invalid the residence of this Island or

remedy. For it is of vital importance that a change of climate should be well studied, and that the utmost care should be exercised in selecting the most appropriate localities. On this point the physician cannot employ too much reflection. The variations and distinctions of temperature are so numerous and yet so important, that places within a few miles of each other may differ materially in their relative eligibility as places for the resort of invalids. In the Isle of Wight Ryde and Ventnor are within 12 miles of each other, and yet Ventnor is 4° warmer than Ryde. But Ryde is exposed to the east winds, and located on a hill sloping down to the Sea-shore. Ventnor is sheltered by the singular wall of rock known as the Undercliff from winds; "completely screened from the cutting north-east winds of the Spring, on the one hand, and from the boisterous Southerly gales of the Autumn & the Winter on the other". Clifton and London do not differ considerably in their latitude; but Clifton has only 70 wet days in nine months to 78 in London. The proximity of London to a large river, and the marshes on the east, are probably the causes of the greater humidity of its climate.

On the other hand, it will be found that, under certain conditions, many countries will correspond with each other in the general characteristics of their climate. Thus the South-west of England closely resembles the South-west-

of France (Sir J. Clark) and the Undercliff has been compared to Madeira. This similarity results from a similarity of soil and position.

To attempt a long description of each of the component elements of climate would be to lengthen this essay by the introduction of matter in a measure foreign to its purpose. To the works of those eminent individuals whose arduous duty it has been to portray the physical characters of our globe, we refer for a more minute examination of the physical causes of climate. But as these causes are numerous and important, a brief account of the more interesting, with a mere recapitulation of such as are of less concern to us, is all that my narrow limits will allow.

We have said the physician cannot employ too much reflection in the choice of a locality for an invalid. What then are the points necessary for this consideration? He must ascertain the absence of any great vicissitudes of temperature. He must gain an atmosphere neither detrimental from its moisture nor injurious from its siccity. He must parry the rude Hyperborean blast, whilst he screens his patient from the boisterous South. Excesses of this nature should in every case be avoided. The

Condition of the invalid will suggest the necessity for choosing a keen and tonic, or a mild and balmy air.

What then are the circumstances which by their individual or combined influences produce a climate, on the one hand conducive to human welfare, or on the other, diametrically opposed to it.

According to an erudite authority, physical climate comprehends "the degree of heat and cold, the drought-, the humidity and the salubrity which any given region of the earth possesses". He has particularized nine causes of physical climate, viz:-

1st The action of the Sun upon the atmosphere.
2nd The interior temperature of the globe.
3rd Elevation of the earth above the level of the Sea.
4th The general inclination of the Surface and its local exposure.
5th The position of its mountains relatively to the Cardinal points:
6th The neighbourhood of great Seas and their relative Situations.
7th The geological nature of the Soil.
8th Degree of cultivation and population at which a country has arrived.
9th The prevalent winds.

* "The Influence of Tropical Climates".

In addition to these Mr Ranald Martin has suggested*

10th Position in respect to the Equator.

11th Position in respect to large rivers and lakes.

12th Position in respect to Forests.

And again, another distinguished author (Maury), has stated that if it were not for the modifying effects of the "Gulf-Stream" "the soft climate of England and France would be as that of the Labrador, severe in the extreme, and ice-bound".

A thorough investigation of the above mentioned causes would of itself occupy an extensive volume, but a hasty glance at the most important of them is all that time or space will in this instance permit.

The temperature of a locality is undoubtedly the chief object for the consideration of the invalid. This is dependent on several circumstances. To the influence of the Suns rays we are primarily indebted for the temperature of our climate. But all lands do not possess the same temperature: its varieties are manifold in the different regions of the globe. On what, then, do these differences depends? The latitude; the longitude; the elevation above the level of the sea, and the general aspect of the locality are amongst the prominent causes. "The sea", says Maury, "has its climates as well as the land. They

* "Physical Geography of the Sea", § 75.

* "Physical Geography"

both change with the latitude; but one varies with the elevation above, the other with the depression below the sea-level. The climates in each are regulated by circulation; but the regulators are, on the one hand, winds; on the other currents."* Of the influence which the latitude of a place exerts on the condition of its climate we have a beautiful delineation by Professor Traill#. "Had the axis of the earth been perpendicular to the plane of its orbit, the same places would have had the sun always vertical; the equatorial regions would thus have been parched with intolerable heat; and much of what is now the fairest portions of the globe, the seats of literature and the arts, would have been doomed to sterility and desolation. The simple yet stupendous contrivance of the inclination of the axis to the plane of the orbit, by bringing successive portions of the Northern and Southern hemispheres alternately under the vivifying solar influence, has rendered the largest portion of the globe the abodes of animated beings; the fervour of a tropical climate is thus rendered less oppressive, and the limits of the temperate regions are greatly extended." The influence of latitude is not confined to the generic surface of the earth. For if we consider the interior heat of the globe as one

* Martin's "Influence of Tropical Climates"

Traill's "Physical Geography"

of the causes of physical climate we find that at the depth of 100 feet from the surface the temperature of the earth is the average temperature of the climate, and differs with latitude; thus at Wales, in Lapland it is 36°; at St. Petersburg 40°; in England 52°; at Paris 54°; at Rome 61° and at Cairo 70°. J. Griffiths.* On the other hand it is well known that the temperature of the atmosphere, gradually decreases as we ascend above the level of the sea. The law of this diminution was stated by Sir John Leslie to be 1° Fah. for every 300 feet of elevation.* and by continuing to ascend we should sooner or later arrive at the boundary of perpetual congelation; this being effected at a greater or less height according to the latitude in which it is sought. The altitude at which perpetual snow occurs diminishes from the equator to the poles.* Longitude too exerts a modifying influence on climate. "Thus it is found that the mean temperature of any latitude in Western Europe is higher than that of the corresponding latitude in Eastern Asia or America, as may be seen by casting the eye over Humboldt's chart of isothermal lines. A comparison of similar observations indicated to Sir David Brewster that there were in each continent, certain me-

* Traill's "Physical Geography"

=ridians on which the mean temperature is the lowest- in that parallel. These he termed the cold meridians, in approaching to which the mean temperature falls on either hand."* The aspect of of a country materially affects its climate. "Every one knows", says a celebrated writer, "what effect the exposure of a soil relatively to the sun has upon the temperature. A hill inclined 45 degrees towards the south, when the sun is elevated 45 degrees, receives the solar rays perpendicularly, whilst upon a plain, the same rays strike the soil under an angle of 45 degrees, that is with one quarter less force; and a hill inclined 45 degrees to the north, will be struck by the solar rays in a horizontal direction, which makes them glide along its surface. If the ground is still more inclined to the north, it will receive no rays, and will remain always in the shade. These differences, which are easily perceptible in hilly coun- =tries, are extreme in regions covered with high mountains. It is thus that in the Valais, we see the Alps one side covered with eternal ice, whilst vine- =yards and orchards adorn the opposite hills with all the charms of fertility."

Vicinity to the ocean contributes materially to equalize

the temperature of the atmosphere. And if we wish to observe its beneficial effects, we cannot do better than investigate the nature of the winds which prevail in our own island. We may confine our observations to an East, and westerly or Southerly winds. Trace the origin and course of an East wind across the whole continent of Europe, and part of Asia, and notice its condition and its effects, both on the animal and vegetable world when it reaches us. It is deficient both in temperature and moisture both of which it abstracts from the land, rendering us cold and dispirited, giving to the Skin a disagreeably dry and shrivelled appearance. Contrast this with a Southerly breeze which blows over a wide expanse of genial waters before it gains our shores, and hence derives a certain blandness of temperature, and medium amount of moisture which render it mild and yet invigorating. The Ocean too in a great measure prevents any extreme vicissitudes of temperature. It subdues the Summer heat and renders tolerable the intense cold of winter. An eminent American author (Maury) has therefore justly remarked, concerning the effects of the "Gulf Stream" or climate, "One of the benign offices

of the "Gulf Stream", he says," is to convey heat from the Gulf of Mexico, where otherwise it would become excessive, and to displace it in regions beyond the Atlantic for the amelioration of the climates of the British Islands and all western Europe"..... "flowing now more steadily, but dispersing its genial influences more freely, it finally meets the British Islands. By these it is divided one part going into the polar basin of Spitzbergen, the other entering the Bay of Biscay, but each with a warmth considerably above the ocean temperature. Such an immense volume of heated water cannot fail to carry with it beyonds the seas a mild and moist temperature. And this it is which so much softens climate there." Again he says, "Assuming the temperature and velocity" (of the Gulf Stream) "at the depth of 200 fathoms to be those of the surface, and taking the well known difference between the capacity of air and of water for specific heat as the argument, a simple calculation will show that the quantity of heat discharged over the Atlantic from the waters of the Gulf Stream in a winters day would be sufficient to raise the whole column of atmosphere that rests upon France and the British Islands from

* "Physical Geography of the Sea". Maury.

freezing point to Summer heat-". From the same interesting work* we gather that "every west-wind that blows crosses the Stream on its way to Europe, and carries with it a portion of this heat to temper there the Northern winds of winter. It is the influence of this Stream upon climate that makes "Erin the Emerald Isle of the Sea" and that clothes the shores of Albion in evergreen robes; while in the same latitude on this side the coasts of Labrador are fast-bound in fetters of ice".

The character of the soil of a locality influences the nature of its climate. Thus, "all grounds are not heated equally soon. One soil quickly parts with its acquired heat, while another retains it for a long time. Exhalations, which vary according to the nature of the soil, rise into the atmosphere, and become identified with it. Clayey grounds, and those which are impregnated with salt, cool the atmosphere; extensive accumulations of sands, when they are dry, augment the heat. It is supposed, for example, that the severe cold, and unwholesome air which prevail in the governments of Astracan and Orenburg, partly arise from the saline nature of the soil; while several provinces in France owe in part their dry and salubrious temp.

=erature to this, that the soil is sandy, calcareous and in general light. Ground which is stony and barren, emits the fewest vapours. The contrary may be said of marshy soils; grounds of this description, and even sands impregnated with moisture, diminish the heat; and as the waters there are for the most part stagnant, the duration of the frosts is prolonged without bringing in return a sky serene and unobscured by noxious fogs. This is the reason why the winter in Holland, under 52 degrees of latitude, is often more disagreeable than that of the Danish islands under the 55th parallel".

How different is the appearance of a country in which the sturdy arm of man has cleared a path through the once unfathomable woods, & turned its marshy surface into fertile soil, to that which it bore 'ere human labour had spread its civilising influence around. This is particularly to be noticed in the rapid improvements in a newly established colony; where the mortality, which at first is great, from the condition of its soil, from the inundations of its rivers and the consequent malarious emanations from the surface giving rise to epidemics, in a very short time becomes gradually reduced, until at length the fierce struggle

between man and the untamed wilds is ended and "vanquished nature yields its empire to man". And thus does health subdue disease.

Tommerelli, in his "Sketches of Kazan", speaking of the improvement of climate by cultivation, says "Few towns were more unhealthy than Pisa, in Italy; Temesvar, in Hungary; and Stuttgard, in Germany; but the measures which which were taken by their respective governments - the drainage of bogs and marsh = es - the growth of forests, the removal of mountains, and the introduction of rivers and canals, have rend = ered these towns at the present day both healthy and agreeable". On a less gigantic scale than this we may observe the improvements which are constantly taking place, the result of cultivation, in our own coun- = try. Nay, even in our cities and large towns; for in the stead of marsh and bog arable land may be observed, and everywhere sanitary regulation removes the offensive sewer or cess-pool from the crowded court. Both the marsh and the sewer are the hotbeds of mala- = rious diseases and their removal is equally beneficial by rendering their respective neighbourhoods less liable to endemic disorders, and less inviting to diseases of an epidemic character.

It is of high importance to be acquainted with the "Prevalent winds" of a locality; for these form an important item in the consideration of the subject of Climatology. We shall have occasion to refer to this subject again hereafter, when treating of the atmosphere under various conditions, that is to say, meteorologically. In proof of their great influence, however, we have only to consider for a moment the effect of such a wind as the Sirocco, or again the damp winds of South America to whose influence even murderers are said to attribute their foul deeds. "The nature, the direction, and the integrity of winds," says Malte-Brun, "depend upon general and local causes, the neighbourhood of seas, the elevation of mountains, and other circumstances." Dr. Copland gives the following valuable observations (Dict. Pract. Med.) on the winds of Great-Britain. "In Great-Britain," he says, "Northern and Easterly winds prevail in March, April, and May, owing to the current established to replace the warmer air, as it rises from the surface of the Atlantic and more southerly countries now warmed by the sun as it passes to the northward of the Equator. These winds are generally dry and cold, precipitating the moisture in fogs, and oc-

= casioning catarrhal, bronchial, pulmonary and rheu-
= matic affections, and, in certain circumstances, ague.
During summer and autumn, southerly and westerly
winds prevail and the air is more moist, owing to
the temperature of the inland countries of Europe being
now greater than that of the surface of the Atlantic,
and the air loaded with exhalations from the ocean,
rushing to replace the strata which are constantly
rising from the heated surface of the countries and
depositing the moisture in the form of showers, as it-
passes over the land; the hills; the mountains and
places in their vicinity which first attract the clouds
formed by the exhaled moisture, experiencing the greater
fall of rain. During November and December, north-
= erly and easterly winds are again frequent and the
fall of rain is much increased."
Mountains either attract the moisture of the atmosphere,
which, when condensed forms clouds, or else they arrest
the progress of clouds already formed and in either case
procure for the plains beneath a superabundance of
rain. By stopping the winds in part, Malte-Brun
tells us, they may render particular winds more or
less frequent through a certain extent of country. "There
can be no doubt", he says, "that the Alps do contribute in

X "Experiments & Observations on Various Kinds of Air
by Joseph Priestley, Vol. I. p. 93.

Securing to Italy its delightful and happy climate, its perpetual Spring, and its double harvests".
The effects of Forests on climate are various. In one view beneficial in another detrimental. Thus, if they lower the temperature of the earth by intercepting the Solar rays, and obstruct the free circulation of air, on the one hand; on the other they afford shelter from the chilling winds of cold countries whilst they tend to cool the overpowering heat of a tropical climate. "The destruction of Forests", says Malte-Brun," may sometimes prove a blessing to a country by procuring a freer circulation of air; but, carried too far, it becomes a scourge which may desolate whole regions".
The following extract from a letter of Dr. Franklin's[x] will serve to show the opinions of that celebrated philosopher on the subject, He says, "That the vegetable creation should restore the air which is spoiled by the animal part of it, looks like a natural system, and seems to be of a piece with the rest-;" He adds, "I hope this will give some check to the rage of destroying trees that grow near houses, which has accompanied our late improvements in gardening, from an opinion of their being unwholesome. I am certain from long observation, that there is nothing unhealthy in the air of woods; for we

*. "The Lancet", Sept. 6th, 1856.

Americans have everywhere our country habitations in the midst of woods, and no people on earth enjoy better health or are more prolific". And again we read* - "The interposition of a dense forest, of a high wall, a chain of elevated hills, or any other mechanical obstacle, has been known to protect the inhabitants of villages, of camps, of convents, and of single habitations from the pestiferous influence of neighbouring marshes. A convent situated on Mount Argental, near the village of St. Stephano, was for a long time remarkable for its salubrity, until the trees by which it was surrounded were cut down, when it became extremely sickly".

The climate of a locality being thus easily affected by what may be termed outward agencies, it is of high im= portance that the medical man should be acquainted with the characteristics of those places chiefly resorted to by invalids. Two persons suffering from the same disease may so differ in temperament, that the locali= ty appropriate to the one may prove injurious to the other. Besides, all the minutiæ of tastes, habits and mental affections must be studied with care and attention, or change of climate will not produce the beneficial effect desired. Persons of a nervous or hypochondriacal temperament, for instance, would

derive no advantage from a climate suitable to the disease under which they might labour, if the place where they resided was calculated, from its loneliness or any other circumstances, to excite the imagination and depress the spirits. Some temperaments, indeed, are so sensitive to external influences that they derive an exquisite pleasure or experience an acute agony - as the case may be - from things apparently so trivial as the roar of the sea on a rocky coast, or the whistling of the wind through the leafless boughs, or the fragrance of a faded flower.

From these considerations it is obvious that the medical man in advising an invalid to try the effect of change of climate in the amelioration of his health, should carefully consider the temperament of his patient and the characteristics of the locality whither he counsels him to resort: Change of climate may otherwise defeat his object and disappoint the expectations of his patient. A remedy ceases to act as such, unless properly applied, or, as Boerhaave has justly and pithily expressed himself:-

"Nullum ego cognosco remedium nisi quod tempestivo usu".

Having thus endeavoured to define climate, and to show how it is affected by various external agencies,

I shall endeavour, in the next place, to shew how climate may be supposed to originate certain dis-
-eases.

Part II.

Many and various are the causes which induce the susceptibility of the human form to disease. Deprivations as regards the ordinary necessaries of life; excess of fatigue; too great indulgence in animal gratifications; prolonged mental application; or accidental injury, which may be the immediate precursor - the exciting cause. These, and a multitude of others may each in its turn be the unwelcome harbinger of a dread disorder. But man is subject to other agencies, by which he is not only rendered susceptible to disease, but to which also he has to look for life and health. To the atmosphere which surrounds him he is indebted for much of the happiness which he enjoys, and also for many of the diseases to which his flesh is heir. Man is not at all times alike; he differs with the seasons, and he differs with a change in his position on the earth. Variations in the constitution of the atmosphere - vicissitudes in its temperature - its siccity and its humidity - its statical or its dynamical state, and its electrical condition - all affect him more or less; they may at one time tend to his preservation and to the invigoration of his system and at another

* Hippocrates on "Air, Waters, and Places" - Adams, Syd. Soc. Edit.
Vol: I. p: 191.

subject him to pestilence and disease. Who will hesitate for a moment to admit that the study of meteorology is of the utmost importance to the Physician? True: it is not necessary to enter into a discussion concerning the theoretical composition of the atmosphere, for the purpose of ascertaining whether its constituent gases are in a state of chemical combination or of mere mechanical mixture. Nor is it desirable, either, to wander farther back or to entertain the various dogmas of the ancient Philosophers, the doctrines of the Pythagoreans - the Platonists - the Peripatetics - the Stoics, or the Epicureans who spoke of air as they did of fire, earth and water, as being a homogeneous substance, an element. But rather let us take a simple and practical view of the subject and endeavour, if possible, to show how materially such a knowledge of it will aid the Physician in his professional duties. Hippocrates, the "Great Dictator of Medicine, as if in reply to certain scepticisms on this point, observes;- "And if it shall be thought that these things belong rather to meteorology, it will be admitted, on second thoughts, that astronomy contributes not a little, but a very great deal, indeed, to medicine." *

Whilst from an excellent work by an eminent physi-

* "Medical Observations and Research", Laycock, p. 127.

† "The Genuine Works of Hippocrates" by Francis Adams LL.D. Vol I. p. 190.

=cian of the present day we learn that "meteorology in its practical applications, is as important to medical art as to agriculture or navigation; and no practitioner is complete in practical tact without a knowledge of these applications*." I purpose considering the effects of the various states of the atmo-
=sphere, and consequently of various kinds of climate, in producing epidemics and other diseases.

Hippocrates, in his treatise, on "Airs, Waters and Places", observes that "whoever wishes to investigate medicine properly should proceed thus: in the first place to consider the seasons of the year and what effects each of them produces (for they are not at-all alike, but differ much from themselves in regard to their changes). Then the winds, the hot and the cold, especially such as are common to all countries, and then such as are peculiar to each locality*". Before, however, pro-
=ceeding to point out all the evils which an impure atmosphere entails upon us, let us briefly consider, first, the constitution, and secondly the principle func-
=tions of a tolerably pure atmosphere. The atmosphere, then, by which we are surrounded on every side, and which applies itself to the surface of our bodies with a pressure almost incredible, a pressure of 15 ~~lbs~~ to

the square inch of surface, but which pressure is so equally distributed that we are scarcely, if at all, con-
= scious of it, consists chiefly of two gases, Nitrogen and Oxygen, in the proportion of about one volume of Oxygen to four of Nitrogen; and, if our object were to consider the atmosphere in a theoretical manner, we should con-
= fine ourselves to the study of the proportions and mode of combination of these gases; but there is some-
= thing beyond this of greater practical importance to us. For we find besides these, a certain amount of Carbonic acid gas, a trace of Ammonia, a vari-
= able amount of aqueous vapour and a mass of heterogeneous particles which are always present to a greater or less extent; these may be on the one hand innocuous as in the case of the fragrance of a plant or flower, or, on the other baneful and in-
= jurious as in the case of deleterious effluvia or miasmatous particles suspended and transported by it from one district already overwhelmed with disease to another hitherto pure and healthy.
We shall also require to detect its Oxygen in another form for we shall meet with it changed, allotropized into Ozone. And finally it is of much importance to consider its barometrical, electrical, static al,

* (Dr Bust of Bombay)

and dynamical conditions. And now let us pass on to the second of our preliminary considerations viz:- to enquire into the various functions of the atmosphere. And here let me borrow the words of a celebrated Eastern Philosopher*; for, indeed, after reading his eloquent description of the atmosphere and its uses, it would be utterly impossible for me to attempt a similar task without being led away by the elegance of his language into the most flagrant plagiarisms. He describes the atmosphere as, "a spherical shell which surrounds our planet to a depth which is unknown to us by reason of its growing tenuity, as it is released from the pressure of its own superincumbent mass. Its upper surface cannot be nearer to us than fifty, and can scarcely be more remote than five hundred, miles. It surrounds us on all sides, yet we see it not; it presses on us with a load of fifteen pounds on every square inch of surface of our bodies, or from seventy to one hundred tons on us in all, yet we do not so much as feel its weight. Softer than the softest down - more impalpable than the finest gossamer - it leaves the cobweb undisturbed and scarcely stirs the lightest flower that feeds on the dew

it supplies; yet it bears the fleets of nations on its wings around the world, and crushes the most re-=fractory substances with its weight. When in motion, its force is sufficient to level the most stately forests and stable buildings with the earth - to raise the waters of the ocean into ridges like mountains, and dash the strongest ships to pieces like toys. It warms and cools by turns the earth and the living crea-=tures that inhabit it. It draws up vapours from the sea and land, retains them dissolved in itself, or suspended in cisterns of clouds, and throws them down again as rain or dew when they are required. It bends the rays of the sun from their path, to give us the twilight of evening and of dawn; it disperses and refracts their various tints to beautify the approach and the retreat of the orb of day. But for the atmosphere, sunshine would burst on us and fail us at once, and at once remove us from midnight darkness to the blaze of noon. We should have no twilight to soften and beautify the landscape; no clouds to shade us from the scorching heat; but the bald earth, as it revolved on its axis, would turn its tanned and weakened front to the full and unmitigated rays of the lord of day.

It affords gas which vivifies and warms our frames, and receives into itself that which has been polluted by use, and is thrown off as noxious. It feeds the flame of life exactly as it does that of the fire - it is in both cases consumed, and affords the food of consumption - in both cases it becomes combined with charcoal, which requires it for consumption, and is removed by it when this is over."

Having thus learnt the many advantages which we derive from the atmosphere, let us now consider those states and conditions of it which induce the susceptibility of man to disease, that at length we may be able to echo the lines of Dr Armstrong's, who has thus metrically expressed himself:-

"I in prophetic numbers could unfold
The omens of the year: what seasons teem
With what diseases: what the humid South
Prepares, and what the Demon of the East:
But you perhaps refuse the tedious song.
Besides what plagues in heat, or cold,
Or drought, or moisture dwell."

To say that one or other of those functions, which Dr Burt tells pertain to the atmosphere, is the chief would be wrong, for they are all essential to our well-being.

But yet that which is constantly impressed upon our minds, without which we could not exist beyond a few moments, may well claim our most earnest attention, and may, perhaps, without impropriety be considered of paramount importance to us.
For the purpose of respiration, then, we will assume that the atmosphere is of the utmost importance to us; and when we consider how intimately it is interwoven with life - how very large a proportion of it man requires, and not man alone but the whole animal kingdom - and vegetable world - when we consider all this it will be obvious that all other requirements of life do but hold a secondary place in our consideration: and that unless we can have this pure and uncontaminated by noxious particles, whether it be the smoke of the city, the effluvia of corrupting matter, or the dreadful miasm of the marsh, we struggle against an overwhelming enemy and the forces we can employ against it will avail us nothing.
The following table, drawn up by Mr. Farr, as an appendix to the first annual report of the Registrar General, will serve more clearly to demonstrate the great boon conferred on those who enjoy a pure atmosphere.
The calculations were drawn from 32 metropolitan

unions, and 24 of the largest towns in England, including Manchester, Liverpool, Birmingham &c, contrasted with the counties of Cornwall, Devon and others comprising an almost equal number of inhabitants. The mortality in each case during six months from twelve different classes of disease is thus shewn.

	In London and 24 other towns containing a population of 3,553,000 —	In rural districts cont^{g} a pop^{n} of 3,500,000.
Epidemic, Endemic & Contagious diseases..	12,766	6,045
Sporadic diseases		
Of the Nervous System,	7,705	3,607
" " Respiratory System,	12,619	7,847
" " Organs of Circulation,	590	309
" " Digestive Organs,	3,476	1,832
" " Urinary Organs,	219	161
" " Organs of Generation,	460	265
" " " " Locomotion,	262	154
" " Integumentary System,	62	55
Of uncertain seat,	4,396	3,730
Age,	2,924	3,102
Violent deaths,	1,370	929
Not specified,	1,104	1,657
Total	47,953	29,693

The average proportion of Carbonic acid gas which the atmosphere contains, is, according to De Saussure, from 3.7 measures to 6.2 measures in 10,000 measures of air. Now from the specific gravity of Carbonic acid being so much greater than that of atmospheric air, it might naturally be supposed that it would sink to the bottom, and be found only as one continuous stratum along the surface of the earth. If this were the case, what would become of the animal creation to whose existence this gas is so hostile? Experiments, however, prove its presence in lofty situations as well as at the level of the sea, and for this purpose the diffusive power of gases, a property without which it is evident animal life would be extinct, comes to our rescue, and, by holding it in suspension and distributing it in an equable manner throughout the entire mass of the atmosphere, renders Carbonic acid an essential and useful ingredient, and prevents its becoming, as by accumulation it would become, a fatal and deleterious gas.

In proof of its distribution, I may add that it was obtained by De Saussure from the summit of Mont Blanc and by Humboldt from the loftiest of the Andes; its presence has also been determined

* Published in "Edinburgh Medical & Surgical Journal" for 1846.

Not having a copy of the above mentioned journal by me at present, I use the words of Dr Carpenter on the subject.

on the loftiest passes of the Alps. The Great St. Bernard, Simplon and Mount Cenis, it has also been found in the atmosphere incumbent over the Breakwater in Plymouth Sound, and that of the Mer de Glace, near the lofty glaciers of Talesie.

From experiments made by Dr Snow* it appears "that the presence of Carbonic acid in the atmosphere acts more deleteriously upon the system, in proportion as the normal quantity of oxygen has been reduced. He found that birds and mammalia introduced into atmosphere containing only from 10½ to 16 per cent of oxygen, soon died, although means were taken to remove the Carbonic acid set free by their respiration, as fast as it was formed; whilst, on the other hands, an increase in the proportion of Carbonic acid to 12 or even 20 per cent - the per centage of oxygen being kept to its regular standard of 21 per cent - did not appear to enfeeble the vital actions more rapidly than did the reduction of the oxygen in the experiment first referred to. Dr Snow concludes,* from his experiments on the lower animals, that 5 or 6 per cent of Carbonic acid cannot exist in an atmosphere respired by man, without danger to life; and that less than half this amount will

soon be fatal when it is formed at the expense of the Oxygen of the air".

The amount of Ammonia in the atmosphere is so small that its influence on health may be consi-dered immaterial. The experiments of Horsford tend to show that it is most abundant in the atmosphere during the month of July and least so during December.

Few exciting causes produce a train of disorders so extensive as vicissitude of temperature. It is in the fitful atmosphere, that the "curse" of Britain rears its pale and hollow features. Upon the change-ful blast Consumption rides, attended by numerous other disorders of a character scarcely less treacherous and insatiate. But, though the climate of the British Isles is of a capricious nature; though the atmospheric vicissitudes are constant, and the alternations from heat to cold, rain to drought, calms to gales are of almost daily occurrence. Is it not to this varia-bility of climate that the inhabitants of Great Britain owe their acknowledged superiority in psychical de-velopment! It is to this that Britain owes the main-tenance of her undisputed pre-eminence. What, though we do not possess a climate such as that of

* "Consolations of Travel" 1830. Sir H. Davy

"Nice, Naples, or Italy where, even in winter, it is possible to enjoy the warmth of the sunshine in the open air beneath palm trees, or amidst the evergreen groves of orange trees, covered with odorous fruit and sweet scented leaves, where mere existence is a pleasure, and even the pains of disease are sometimes forgotten amidst the balmy influence of Nature, and a series of agreeable and uninterrupted sensations invite to repose and oblivion".* What, though the 'merry Christmas' finds us in Britain, seated round the cheerful hearth deriving a genial warmth from the crackling 'Yule-log' rather than the balmy air of orange groves; have we not limits to the changes of our atmosphere! The vicissitudes, though constant and rapid are limited to a very narrow range, and we become inured to them; for with us it is only a little colder or a little warmer to day than yesterday; whilst in Italy (I quote from the "Diary of an Invalid"), in Feb.y, "the weather is beautiful and as warm as a June day in England. We sit at breakfast without a fire, or a marble floor - with the casements open enjoying the mild breeze". And again, the following day, "Oh this Lands of Zephyrs! Yesterday was warm as July; to day we are shivering with a bleak easterly wind, and

an English black frost. Naples is one of the most-
climates in Europe for complaints of the chest. What-
=ever we may think of Sea air in England, the
effect is very different here. The Sea-breeze in Devon-
=shire is mild and soft - here it is keen and
piercing". And again, in March the same writer
exclaims, "Agri Somnia - if a man be tired of
the slow lingering process of consumption, let
him repair to Naples, and the dénouement will
be much more rapid. The Sirocco wind, which
has been blowing for six days, continues with the
same violence. The effects of this South-east blast,
fraught with all the plagues of the deserts of Africa,
are immediately felt in that leaden oppressive dejec-
=tion of the spirits, which is the most intolerable
of diseases." If we have much to regret in
our climate, at least we have a good deal to
rejoice at. But, although the vicissitudes of temper-
=ature are not so great with us, and the strong
and robust feel them but little, if at all, yet there
are those to whom even slight variations will prove
prejudicial, and it behoves Physicians as well as
invalids, to be cognizant of the localities in which
these alterations least occur, so that a change to

them may be effected when desirable, or in the event of this being impracticable, then, to be aware of the best means for combating their prejudicial effects; and for this purpose let us enquire a little more into the qualities of these respective changes.

Equability of temperature should be our chief object in the selection of a locality for delicate persons. Let us, then, enquire into a few of its most important physical conditions, and first:- Barometric Influence. Taking the average surface of the human body as fifteen square feet, the pressure of the atmosphere, at ordinary temperatures and conditions, on such a surface has been rated at upwards of 33,000 pounds, and it has been estimated, that the variation of a single line in the height of the mercury produces a change of 140 pounds in that pressure. If, then, so immense a change be the result of so trifling a variation in the barometer, it is clear that a still greater alteration in the rise or fall of the mercury will be followed by a marked difference in the atmospheric pressure, and it requires but little reasoning to prove the effects of such vicissitudes on the system. The injurious effects of these variations are most

* "Voyages" Nos: 659 and 2021

※ Communicated in "Lancet" '42 - '44.

visible when the change is rapid, as is the case in the ascent of high mountains; for at such a height, Saussure* tells us, the diminution of the weight of the air, combined with other circumstances, occasions vertigo, nausea, hemorrhages and a feeling of universal uneasiness. There is also a very interesting statement, quoted by Dr Laycock in his valuable papers on 'Vital Proleptics',* of a journey undertaken by Lieut. Woods to the source of the Oxus," a lake situate in a part of the Himalayan or Hindoo koosch Chain, at an altitude of 15,000 feet above the level of the Sea. He and his party experienced so great muscular debility, evidently from the want of a sufficient supply of oxygen, that even conversation could not be kept up without exhaustion. His observations on the pulse are interesting - 'I felt the pulses of my party whenever I registered the boiling point of water. The motion of the blood is, in fact, a sort of living barometer, by which a man acquainted with his own habit of body can, in great altitudes, roughly calculate his height above the level of the Sea: Upon Pamir (the source of the Oxus)

* "Journey to the Source of the River Oxus &c"., 8vo London 1841. p. 362.

* "Vital Prolepticks", Laycock.

the pulsations in one minute were as follows:-

	Shoots	Country	Habit of Body
My own	110	Scotland	Spare
Gholam Hassein, munshi	124	Jasulmere	Fat-
Omeralleh, mule driver	112	Afghan	Spare
Gaffer, groom	114	Peshawaree	Spare
Dowd, groom	124	Kabuli	Stout-"

In the same valuable contributions* we read. "However, what theory soever we adopt-, it is quite certain that atmospheric vicissitudes influence vital action most extensively. For, to the country resident, Spiders, a leech in a bottle, sheep or cattle in a field, or rooks are efficient substitutes for the barometer; while, to the citizen, a rheumatic joint, or tender corn forecast change in the weather as surely, often more surely than the weather glass". How the changes in the atmospheric pressure produced such effects as above mentioned is not easily explained. Hufham ascribed its influence to the variations in pressure upon the veins and thereby affecting the circulation of the blood. He says, "But as we now most certainly know, from the history of the barometer, that the weight of the atmosphere is greater at one time than another in the ratio of $\frac{1}{10}$ of the barometric column of mercury, so great a difference cannot-

* Haygham, p. XII. London 1769.

* "Researches on the Influence exerted by atmospheric Pressure on the Progression of the Blood in the Veins"

but very greatly affect us, who are subject to it; seeing that it amounts to 3200 lbs: the half of which we oftimes bear in a very few hours. But we have also shown that the pressure of the atmosphere much contributes to promote the circulation of the blood, its greater weight therefore increases, and a lesser diminishes it:- Hence it happens that when endued with a proper gravity and elasticity, we find ourselves more alert and strong; for, the velocity of the blood being increased, our natural secretions and excretions are increased also, especially perspiration, which being duly carried on produces both vigour of mind and body.
But farther, a great compression on our bodies constringes the vessels through the whole external habit, which in effect is the same as if the very quantity of the blood was increased, for it not only quickens the motion of the humours, but also the more the external habit is pressed, the more the blood is forced to the internal and most vital parts whence they are enabled to exert their action with more force*". And in Sir D. Barry's work# we read, "It being now evident that the blood in the veins is placed under the influence of atmospheric pressure it would be curious to trace the connection

* "Bridgewater Treatise" VIII. p. 353.

which appears to exist between disease generally - in-
=termittent fever for example - and the daily atmo-
=spheric variations". On the high state of the ba-
=rometer in connection with the cholera epidemic,
Dr Prout gives the following very interesting account:*
"On a particular day, the 9th Feb.y, 1832, the
weight of the air suddenly appeared to rise a-
=bove the usual standard. As the rise at the
time was supposed to be the result of some acciden-
=tal error, or of some derangement in the appara
=tus employed; in order to discover its cause, the
succeeding observations were made with the most
rigid scrutiny: but no error or derangement
whatever could be detected. On the days immedi-
=ately following; the weight of the air still con-
=tinued above the standard; though not quite so
high as on the 9th Feb.y, when the change was first
noticed. The air retained its augmented weight du-
=ring the whole time these experiments were carried
on, namely, about six weeks longer. The increase
of the weight of the air observed in these experiments was
small but quite decided and real. The method
of conducting the experiments was such as not to
allow of an error, at least to an amount so great-

as the additional weight, without the cause of that error having become apparent. There seems, therefore, to be only one mode of rationally explaining this increased weight of the air of London in Feb.y 1832; which is, by admitting the diffusion of some gaseous body through the lower regions of the atmosphere of this city, considerably heavier than the air it displaced. About the 4th Feb.y, the wind which had previously been west, veered round to the east; and remained chiefly in that quarter to the end of the month. Now, precisely on the change of the wind the first cases of epidemic cholera were reported in London, and from that time the disease continued to spread. That the epidemic cholera was the effect of the peculiar condition of the atmosphere is more, perhaps, than can be safely maintained; but reasons which have been advanced elsewhere lead the writer of this Treatise to believe that the virulent disease termed Cholera was owing to the same matter which produced the additional weight of the air. Dr Prout further states that in all probability the foreign body diffused through the atmosphere of London in Feb.y 1832 was a variety of miasmia. The amount of aqueous vapour which is contained

※ " Memoires de Berlin 1768.

in the atmosphere exercises a powerful influence on its barometrical condition. It may be, therefore, as well in the first place to consider the atmosphere with respect to its moisture. "The proportion", says Malte-Brun, "subsisting between the weight of atmospheric air, and of distilled water at the temperature of 32° Fahrenheit, and with a mean pressure of 28 inches of mercury, according to very accurate experiments is that of 1 to 11. It is also necessary to observe the weight of the atmospheric air, in its ordinary state, arises perhaps in a great measure from the presence of various foreign bodies which are floating in it continually". Lambert estimated, that supposing a cubic foot of air to be composed of 684 parts, 222 of these would consist of extraneous matter*.

The atmosphere always contains more or less of moisture. Its hygrometric state is influenced mainly by its temperature. A moderate amount of moisture is agreeable to the physical condition of man, whilst its entire or nearly total absence is baneful. But, on the other hand, an excess of humidity is highly injurious.

Indeed temperature and the hygrometric condition of the atmosphere constitute two of the most important items for the consideration of the physician in choosing a place of resort for an invalid. In what manner, then, does excess of moisture exert so prejudicial an influence on the system. During respiration certain changes are effected in the constitution of the atmosphere, so that the air exhaled differs materially from that which was inspired. This altered state is not confined to the elements of its gaseous constituency - to its oxygen, its nitrogen and its carbonic acid - but it is found to have gained an increased amount of aqueous vapour. Whence does it obtain this superadded moisture, and how? "This it doubtless acquires, in accordance with physical laws, through its exposure to the warm blood which is spread out over a very extensive surface, the intermediate membrane being extremely permeable; and the variations in its amount will depend upon the physical conditions under which that exposure takes place. The air expired in ordinary respiration is charged with as much watery vapour as saturates it at the temperature

※ "Principles of Human Physiology", Carpenter.

of the body; and consequently the amount of watery vapour thus exhaled will vary (for equal volumes of air at any given temperature) in the inverse proportion to that which the air previously contained." It is obvious, therefore, that air already loaded with moisture cannot take up as it ought that which the blood in the lungs is eager to impart to it. What is the consequence! The lungs are overburdened with an excess of vapour, the blood is not properly depurified and the system is rendered susceptible to a long list of ailments, especially those of a pulmonary nature. The pernicious effects of a damp atmosphere are admirably exemplified in the case of the damp winds of South America. From the accurate description of Sir Woodbine Parish we learn that there is an almost marvellous difference between the effects of a north and a south wind on the inhabitants of Buenos Ayres; the former blowing across a marshy, damp district, the latter from the long chain of the Andes. Now when the north wind arrives at Buenos Ayres it is so charged with moisture to such an extent that even keys and such like articles rust when

carried about the person, and the condition of the system under these circumstances, is one of extreme relaxation and lassitude whereby the pores of the skin are opened affording an easy entrance for influenza's, rheumatisms and numerous other affections; and the inhabitants are obliged to wear woollen clothing even in the hottest weather to protect themselves from its injurious effects, while the south wind reappears bearing on its wings health and happiness. In the 'constitutions' of Hippocrates we find that the season was remarkable for its great amount of rain which "undoubtedly operated," says Dr Haviland, "as a powerful cause in the production of the prevailing diseases, when we consider the important part in the animal economy that devolves on the cutaneous system, how necessary the due performance of its duties is in order to preserve the internal organs from being overtasked and how much its function is influenced by external agents, we must consider the skin to be one of the grand media through which the atmosphere and its varied conditions act upon the viscera within. Twenty-eight miles of perspiratory tube are estimated to be distributed

Haviland. Op: Cit.: p. 34.

Over an average sized adult, seven millions glands are constantly working to carry off redundant moisture and excrementitious matter; eleven grains, according to Seguin, are insensibly exhaled every minute, or about thirty-three ounces daily, which is nearly equal in amount to the renal secretion, the latter being regulated by the former, - for in the warm dry air of the Summer the skin is stimulated to increased activity and relieves the kidneys: on the other hand, in winter, exhalation is impeded from the surface by cold and moisture, and consequently the renal organs are called upon to supply the place of the skin".

The effects of moisture differ materially according to the temperature of the atmosphere in which it is suspended. Thus Sutton, in speaking of "a cold and moist air", says "it greatly hurts us, as its cold astringes the pores and its moisture shuts them, both one and the other hinders perspiration very much; even electrical bodies send forth their effluvia much more sparingly in moist than in dry weather.... Besides a showery, rainy season

lessens the gravity of the atmosphere and its too great humidity enervates the force of the fibres, and both impede the velocity of the blood and of course the due secretion and excretion from it: hence serous phlegmatic humours, rheums, tumours of the fauces, squinzies and many other dis-orders, and, at length, if such a season continues long, catarrhal fevers, intermittent, putrid and slow nervous fevers, unless these retained humours are happily thrown off by the skin, which is best, or by urine or stool, before they begin to putrefy.. .. Nor doth a moist and cold constitution of the air hurt only in the manner described, but even the very cold humidity is drawn into the body by the pores. Even the great Father of medicine Hippocrates, 2000 years ago asserted this imbibing power of the body when he pronounced that the whole body was not only ἔκπνοον (exhaling) but also εἴσπνοον (inhaling) and so Galen interprets the last word, to wit of moisture or vapour being drawn in through the pores of the skin"

The same Author speaks of a moist and sultry

* "Observations on Air and Epidemic Diseases from the Year 1728 to the Year 1737 inclusive", Huxham. Preface p. xxiii

air as causing a very unhealthy season, "for heat as well as moisture", he says, "relaxes the fibres, what then will they do conjoined? They destroy their very tone almost - and for as much as a moist temperature of the air takes off commonly from its due gravity, which, as we have shewn above, lessens the circulating force of the blood, and as a moist air also hinders due perspiration, such a constitution of the atmosphere hath been justly deemed from the very earliest times pestilential. The obstructed humours then become daily more and more acrimonious, and from a defect of due motion the lymph grows scarcy, the blood runs into grumous concretions, and its salts mutually attracting each other, form dangerous molecules, and at length the mass of humours putrifies: hence a vast number of diseases arise both acute and chronic when such a heavy and unwholesome constitution of the air prevails*."

Hecker in his account of the first visit of the "Sweating Sickness" which occurred in August 1485 has the following in his section on the 'Causes',

after speaking of the gluttony common at that period, he says," to this may be added the humidity of the year 1485, which is represented by most chronicles as very remarkable. Throughout the whole of Europe the rain fell in torrents, and inundations were frequent. Damp weather is not prejudicial to health if it be merely temporary, but if the rain be excessive for a series of years so that the ground is completely saturated, and the mists attract baneful exhalations out of the earth, man must necessarily suffer from the noxious state of the soil and atmosphere. Under these circumstances epidemics must inevitably follow. The five preceding years had been unusually wet, 1485 proved equally so; the last hot and droughty summer was that of 1479. Extensive inundations of the Tiber, the Po and the Danube, the Rhine and most of the other great rivers, took place in 1480, and were attended with the usual consequences, the deterioration of the air, misery and disease.
The greatest inundation ever remembered in England was that of the Severn, in October, 1483. It was long afterwards called the Duke of Buckingham's great-

* "Epidemics of the Middle Ages". p. 187.

valer, because it frustrated the rebellion of this powerful subject against Richard III, whom he had been instrumental in placing upon the throne - and consequently defeated also the first enterprize of Henry VII. It lasted full ten days and the tremendous ravages occasioned by the overwhelming torrent dwelt long in the memory of the people*". This disease was carried off on New Years day, 1486 by a violent south-east wind. The second visitation of the 'sweating sickness' occurred in 1506. On this occasion it presented a very small character in England but not so in the rest of Europe. After a wet Summer in 1505, a severe winter set in. Comets were seen in this as in the following year. An eruption of Vesuvius also took place in 1506. (Hecker). Speaking of the third visitation of the same disease, however, which occurred in April and May 1517, and which was "so violent and rapid in its course, that it carried off those who were attacked in two or three hours", Hecker observes that its causes were obscure, "It is especially remarkable", he says, "that on this occasion there is no express mention of the humidity which led to

* Op. Cit.: p. 211.

* "Annals of Influenza"

decided a share in the origin of the two former visitations, and the year 1514 was in most respects one of an ordinary kind*". Numerous other instances are on record of epidemics following on a moist constitution, thus from the compilation in Dr Theophilus Thompson's work* of authors on Epidemic catarrh we find that the epidemic of 1510, "was preceded by a long continuance of moisture and followed by remarkable storms". That of, 1557, "was preceded by ill-smelling fogs, and followed by great inundations. There was great dearth in England, in consequence of the wet season which preceded harvest. The disease commenced in October, after a month of unusually cold winds. A comet. The previous year an eruption of Etna". That of, 1580, "commenced in October after a cold dry wind, preceded by two or three years of a moist, rainy, southerly constitution. Earthquakes in Yorkshire and Kent. Remarkable meteors in November". That of, 1658, "In April, in the midst of a winterly Spring". That of 1675 "after pungent fogs and cold moist weather following; a hot summer. An eruption of Etna". That of 1710, "during a moist southerly constitution, preceded by a long continued, intense frost." That of

1729, "After a rainy November with high tides": that of
1732-33, "very southerly; wet northerly winds. Volcanic
eruptions. Vivid Aurora Borealis". A comet.
Prevalence of the Arctic Rheumatism. At the de-
=cline of the disease, remarkable meteor exploding
in the air, and a fetid fog." That of.
1775; "Prevailed during a wet autumn". That of
1782, "In 1781, Summer very dry. Autumn very rainy.
Winter changeable. Spring of 1782, remarkably late,
then gloomy, cold, humid with occasional dry
fogs, and peculiar storms." That of;
1833, "In April, after damp weather succeeding to
cold". That of.
1837, "After great humidity and considerable atmo-
=spheric vicissitudes."

Thus, then, we observe that in all ages an excess of moisture in the atmosphere has been justly considered injurious. But a certain amount is necessary to our well-being; and, if the physical law whereby the atmosphere is maintained in a healthful condition, can be infringed upon by an excess of humidity, it is obvious that a deficiency of the due amount of moisture will tend inversely to violate the same law. On this matter Hurpham

says that, "a dry air is commonly of great gravity and elasticity, which quickens the motion of the blood, and, as it is very hot, it greatly draws off the perspiring humours, so that the serous and most liquid parts of the blood fly off, and are dissipated, whence the remainder grows too thick, for little, or nothing, now of moisture is drawn in through the pores from the torrid atmosphere... Thus the long heat of the summer so roasts, as it were, the animal humours that they become much more acrid in Autumn than in the Spring season: this is that adustion of the blood, which the ancients so often talk of, for hence a great quantity of acrid bile is generated; whence cholera, dysentery, bilious colics, putrid and malignant fevers are so frequent in the autumn". "It is remarkable", says Haviland, "that many Epidemics have occurred after very dry seasons; for instance, the plague at Constantinople in 1541 succeeded to the drought of 1540". And Hecker, speaking of the plague in China of 1334, writes, "Here a parching drought, succeeded by famine, commenced in the tract of country watered by the rivers Kiang and Hoai; and this", he adds, "was followed by such

violent torrents of rain in and about Hongsai, that more than 400,000 people perished in the flood".
"Again in Iche, after an unexampled drought a plague arose which is said to have carried off 5,000,000 people. The year 1854 was remarkable for its drought, the amount of rain that fell at Greenwich being only 18·7 inches, or 7·3 inches less than the average of 39 years."
The distressing effects of an exceedingly dry atmosphere are observed in those climates which fall within the range of such a wind as the Sirocco, which, passing from Egypt, spreads over the whole of the Mediterranean. It gives rise to difficult and painful respiration; and as a proof that its baneful influence lies in its siccity, the best mode of modifying its effects is to sprinkle water on the floor in order that by its evaporation into the atmosphere it may in a measure subdue its pernicious tendency.
Thus, then, we see that the hygrometric state of the atmosphere is of no small importance to invalids, and not to invalids only but to the strong and healthy; for as Maury, in speaking of the effects of the 'Gulf Stream', says, "when the East wind blows

* Op: cit: 225 passim

along the Atlantic coast for a little while, it brings us air saturated with moisture from the Gulf Stream, and we complain of the sultry, oppressive, heavy atmosphere; the invalid grows worse, and the well-man feels ill, because when he takes this atmosphere into his lungs, it is already so charged with moisture, that it cannot take up and carry off that which encumbers his lungs and which nature has caused the blood to bring and leave there, that respiration may take up and carry off. At other times the air is dry and hot; he feels that it is conveying off matter from his lungs too fast; he realizes the idea that it is consuming him and he calls the sensation burning.* Excesses, therefore, whether they be on the side of moisture or dryness are alike injurious, and should be particularly avoided, especially by those of a weakly habit of body, whose respiratory system is irritated by but a slight departure of the atmosphere from its normal standard of purity. Hence the necessity for avoiding the margins of muddy rivers, the neighbourhood of stagnant lakes or marshes, and, indeed, all causes which keep the atmosphere of the locality permanently surcharged with moisture, or too dry.

Beyond the various conditions of the atmosphere which we have hitherto considered, and which are more popularly acknowledged as exercising a powerful influence on health, we have also to consider other circumstances. It is now generally believed, and experiments have gone far to substantiate the belief, that there is something else than the mere consideration of the thermometer, the barometer and the hygrometer required before we can arrive at any just conclusions as to the relation which meteorology bears to medical science. We must apply the electrometer and the ozonometer to the atmosphere and consider their results. For, that changes in its electrical condition are intimately connected with many diseases, especially those termed 'Epidemics', is now almost universally admitted. How the different electrical conditions do affect us is still a matter of speculation. Indeed, but little progress has been made in this path of enquiry for we learn from writers of nearly half a century ago that "though we admit the influence of atmospheric peculiarities on our health, yet the manners and extent of their operation cannot be easily ascertained. They may depress persons, already weak,

* "Researches about Atmospheric Phenomena", by Thomas Forster. 1813, p. 117.

of their electricity and thus the energies of the brain and nervous system may be diminished: or the atmospheric electricity being unequally distributed in the air, or propagated downward at intervals, it may occasion an irregular distribution of it in our bodies, and produce an irregularity of function. In whatever way the nervous functions may be disturbed, a disordered action of the digestive organs will be the probable consequence; and a state of nervous and digestive disorder being once induced, other diseases may ensue to which there may be a constitutional predisposition*"

Changes in the electrical condition of the atmosphere have been noticed as the forerunners of an epidemic disorder visitation, especially before the last scourge of cholera in India and also in many other parts of the globe. Immediately before it showed itself in England the atmosphere was noticed as being strongly charged with electricity; thunder storms and a 'Silent-Lightning' were very common. It was also noticed that thunder storms had a peculiar tendency towards the margins of rivers and extensive sheets of water; and that cholera evinced a like peculiarity.

Mr Haviland gives an interesting illustration. He proves from tables drawn up from meteorological observations taken during the cholera epidemic of 1854 at the Royal Observatory that the atmosphere was charged almost daily with positive electricity during the prevalence of cholera; but that at the commencement of the year, before the epidemic had made its appearance, little or no electricity could be detected in the atmosphere at all. Greenwich, at which place the observations were made, was sorely afflicted with the epidemic. The following tables, as set forth by Mr Haviland, show the different kinds of electricity detected during the twenty-two weeks of the cholera epidemic of 1854, and during the first twenty-two weeks of the year when cholera did not prevail, respectively

During the weeks in which the epidemic prevailed—

Positive electricity was shown in	101 days
Negative " " "	9 "
Alternately positive and negative	7 "
No electricity shown at all	9 "
Apparatus out of order	28 "
Total	154 "

* Op: Cit: Pp: 134.

During first twenty-two weeks of the year:-

Positive electricity was shown in	23 days
Negative " " "	0 "
No electricity shown at all	93 "
One thunderstorm	1 "
Apparatus out of order	37 "
Total	154 "

"During the decline of the Cholera", says Mr Haviland, "the greatest amount of negative electricity was developed especially during the week ending Nov.r 18th, when this kind was exceedingly strong. The tension of the electricity developed throughout this time was in the average "moderately strong"*."

The Oxygen of the atmosphere, which is so essential to life, without which we could scarcely exist for an instant, which, duly tempered to our use by its incorporation with the azote of the atmosphere, gives to us life, health and vigour, may, by undergoing a change the nature of which chemists have hitherto failed to discover, become unfitted for respiration, and capable of exercising an influence prejudicial to health.

Ozone - So this new, this allotropic form of oxygen

is called - has not the power of supporting animal life: thus it has one negative quality opposed to the positive fact that oxygen in its pure state can do so. All its other properties appear to be positive and immediately opposed to the corresponding negative qualities of common oxygen: that is to say, it is odorous, corrosive, and when breathed has a stimulating property whereby the mucous passages of the whole respiratory system are irritated and inflamed. Like chlorine, it has the power of bleaching; it corrodes silver, & decomposes iodide of potassium. The latter property is taken advantage of for testing its presence in the atmosphere. Ozone may be produced artificially by the action of phosphorus on oxygen under certain circumstances: other substances have the same effect in producing it when brought in contact with oxygen. Electricity is also said to exercise a powerful influence in its generation, and hence the smell of ozone in the neighbourhood of electric machines.

It has ozone, then, any other properties whereby its positively injurious effects may be counterbalanced. We know that it has the power of destroying

* "London Gazette Med!" Vol: III. p. 410.

all the disagreeable odours arising from decom=
=posing animal and vegetable matters: but-
that it removes also the active contagious prin-
=ciples arising from similar causes is not by
any means so clear. Indeed, the few experi-
=ments of this kind that have been made
with it are not sufficient to determine this
point. If, however, we argue from its analogy
to chlorine, we should conclude it has no such
power; for Dr Albers tells us*, "at the time that the
cholera hospital was filled with clouds of chlorine,
then it was that the greatest number of atten=
=dants were attacked". But that ozone does to
a certain extent exercise a beneficial influence
when abroad in the atmosphere is highly probable;
for, M. Lavilane whilst making "observations on the
presence of ozone in the atmosphere", ascertained that,
"its amount was in direct ratio to the height of the
wind"; hence he infers that, assuming ozone to have
the power of destroying the baneful effects of
noxious effluvia, it is the want of ozone during
calms which renders the spread of diseases of
a zymonic kind so rapid and fearful;
and that a gale of wind by increasing the

amount of ozone checks their progress, and is "the cause of the decline in mortality from cholera and other fevers of its class."

Whilst poets delight to speak of "calms" and "zephyrs" and "gentle breezes", as being conditions of the atmosphere in which alone we can exist truly happy: we find the same words in all treatises on epidemics, displayed in ominous italics or still more fatal capitals. All agree that a <u>calm</u> state of the atmosphere is favourable to the spread of epidemic disease, and that, if we may so dress an old adage in a new garment, whilst the atmosphere sleeps, diseases play. Every one, whether professional or otherwise, hails with joy the springing up of a good stiff breeze, and bids adieu without regret to the previous lethargic, enervating, adynamic condition of the the atmosphere: for well he knows, by a kind of intuitive perception, that at certain seasons the atmosphere becomes, so to speak, less watchful, and that it lets cholera and other fevers of various kinds creep into it, and that whilst it remains inactive he is in a measure unarmed and totally un-

= fitted to cope with the overwhelming force of the developing disease: but, when he feels the atmosphere rousing itself up, as if enraged at the presumption of the deadly intruder, and lashing itself into a gale; and perhaps at the same time generating an overpowering mass of ozone; then he feels that the death blow is about to be given to his threatening foe and that he is once more placed within the pale of comparative security. "It is even more important to have a constant supply of air than a constant supply of water. Stagnant polluted air is the most immediate = cause in the production of low fevers. One great reason why these fevers lurk in blind alleys and culs-de-sac, is this stagnation of the air. I entertain a strong opinion, that could we ensure a continuous current of wind through even some of our worst localities and houses, fevers might be literally blown away. I would earnestly impress the importance of taking every opportunity of piercing those places and carrying a thorough communication into

* "Fourt- Quart[r] Rep[t] of Health and San[y] Condition of Shoreditch",
Robt Barnes, Lon: 1856, p. 17.

the open sheet beyond. The words "No thoroughfare" are significant of incalculable mischief*". From the time of Hippocrates to the present day calms have ever been associated, when occurring during a sickly season, with the maximum of mortality. But although winds are beneficial in sweeping away sickness from an infested locality, still those winds of themselves exercise a considerable influence on physical climate and should be well considered. Whatever tends to disturb the equilibrium of the atmospheric particles, and give rise in consequence to a restoration of those particles to their normal condition, causes a movement to a mass of air of a greater or less force and which we call wind. Winds have been distinguished as "constant" and "variable", "General" and "partial". It is with the variable and partial winds that we are more especially concerned in this subject. The origin of variable winds, according to Malte-Brun, is from "irregularities of the earths surface and the diversity of its solids, which have no

doubt a powerful influence on the constitution of the atmosphere. At one place mountains, covered with eternal snow, arise and prevent the air undergoing the same evaporation as in valleys; at another, forests, marshes, savannahs, are spread out and exhale various inflammable gases; at a third, we observe large basins of water, surrounded irregularly indented by land. The air must, therefore, suffer relative and partial condensations and evaporations; hence the sea-breeze, the land-breeze, the mountain-breeze. Those changes too will occur differently in summer and in winter, during the day and during the night. Hence the morning and the evening breezes, — those curve maticales, those zephyrs, whose refreshing breath accommodates us in the warm season". The nature of the soil also, of a locality, by its exhalations influences the character of the winds, for instance, "in Arabia, the Simoom carries much nitrous gas along with it; the Harmattan of Guinea much oxygen; the Chamsin of Egypt much azote". "Clouds by intercepting or condensing the suns rays; common rain

by its cooling effects; vegetation by absorbing great quantities of air; the decomposition of animal and vegetable substances, may all contribute to the formation of local winds."

We have already spoken, at length, of the winds of Great Britain; it is a subject of vast importance and one worthy of serious consideration on the part of those who are either themselves invalids, or who are interested for others who are.

In drawing this part of my lecture to a close I cannot but feel how very far it is from being what I could have wished it to be. It may be thought that I have omitted much of importance, whilst I have dilated on matters of a much simpler and less interesting nature: that the influences of clouds - Comets - meteors - volcanoes and earthquakes - were fitting matters for enquiry in connection with this subject. But, confined within a narrow space, I have endeavoured to occupy it with purely practical and useful matters. The Science of Meteorology is a most comprehensive one, involving an intimate knowledge of the nature and composition of the circumam-

= brent- c Spherical shell", the atmosphere; of the laws which govern it-; of the source and conditions which produce rain, hail, snow, dew, fogs; of aerolites; of atmospherical, electrical and optical phenomena. It is intimately and inseparably connected with several of the sister sciences, and hence it is by far too voluminous a subject to be entered into minutely by physicians. But to pick up by the wayside such parts of it as bear a near relation to medicine is the duty of every medical man. Such contributions as the following, which I find in "the Lancet" of Sept: 6th, 1856, are of great value.

"From recent meteorological observations it appears that the maximum of diseases takes place with decreasing readings of the barometer and thermometer. The wind S.E. by S., the maximum of deaths with similar readings; but the wind N.W. and S.E. by N., the maximum of ozone corresponded to the maximum of disease and the minimum with the maximum of deaths". By making observations of this kind we shall be enabled with greater confidence to recommend certain

climates; or, where the change of residence is impracticable, then, to protect our invalids from the inclemencies of their own native land.

Remembering that although the strong and healthy are able to bear great climatic vicissitudes, yet that the weak are easily oppressed. And by care and attention much diversity of climate may be borne even by the delicate.

Part III.

How change of air acts it is well-nigh impossible to say: that it does in very many instances produce a beneficial effect is undoubted.

Does the atmosphere itself exert any peculiar influence on the system? We have seen that the composition of the atmosphere varies very trifling, if at all, from whatever position it is observed: and yet we see how in many instances even a mere trifling change of position will afford considerable assistance in the cure of disease; for example in the troublesome continuance of the cough, when all other symptoms have vanished, in Hooping Cough; when, to use Dr Watsons words, "Change of air will often remove the cough, as if by magic" though that change be only from one part of a large town to another.

In all probability the atmosphere does exert a certain influence on the animal economy; perhaps by affecting the condition of the blood; and we have seen how detrimental an impure air is, and how

essential it is either to improve the condition of that air or to remove to a locality having a purer atmosphere: while on the other hand, the purest air may not at all times be the most suitable and a change to an atmosphere whose reputation in a sanatory point of view is even inferior to that left behind may become in some cases essential. It is a rare occurrence, a phenomenon indeed, to see a sailor otherwise than a healthy, ruddy, stout fellow: he owes this in all probability to the many changes of air which he experiences in his voyages and there can be little doubt that these different atmospheres have each a peculiar action on the blood, the special effect of one being counterbalanced by the particular influence of another, and thus the lungs obtain a mixed diet of air which may be as essential to the healthy performance of their functions as a variety of food is to that of the stomach, or as a change of mental employment to that of the brain and entire nervous system.

In addition, however, to this subtle and inexplicable action of the atmosphere itself, there are other circumstances connected with a change of climate which are of the greatest importance to the health of those who seek them for the purpose of its amelioration: of these, change of scenery is perhaps one of the most potent. For even the most charming scenery will in time pall the eye, as an oft-repeated air cloys the ear, or as the most interesting study, if unvaried, ceases at first to afford pleasure and ultimately satiates and disgusts the mind. It is through this change of scenery that the mind becomes roused to compare the different objects presented to its view with others which have long since ceased to excite it: and in this manner it is led away from melancholy reflections, and is no longer permitted to spend so much time pondering over the infirmities of the tenement which it occupies; and as the tone of the mind becomes livelier, then the correlative position

of the body with respect to it- is exhibited in its restoration to health and strength. The throwing aside of all concerns which depress the Spirits, whether commercial interests or too intense Study, the exertion of Travelling, the intercourse with Strangers, all tend materially to improve the condi- = tion of the Patient- and to assist the curative tendency of change of climate. But one thing more is still needful without which all the others will avail but little; that one thing is Hope. Change of Climate, if not the Patients own Suggestion, Should be presented to him in all its brightest colours, he must be led to believe that it will work a cure (for it is highly reprehensible to recommend it- unless the chances of a beneficial result are great). It may be at first difficult ~~to~~ ~~first~~ to instil it- into the invalids mind, for there are very many, especially those of nervous, hypochon- = driacal temperament-, who like not to be disturbed but- cathe to remain and brood over their afflictions, many of which, indeed,

have their seat "in animo magis quam corpore;" others, again, there are, who look on the change as a dernier ressort, a last faint hope, and keep it at a distance as long as possible. On the other hand, however, I am quite aware that in many instances it requires much persuasion to restrain the patient's eagerness, who imagines that if he could only reach a foreign climate he would soon be well: whereas his physician knows full well that a journey then would be ill-timed and fatal, and that, in all probability, he would leave his home only to die in a strange country, unattended by "the old, familiar faces" whose sympathy so often mitigates the anguish of disease. But when there is every probability that change of climate will afford relief, then let the patient's mind be cheered by the hope that his journey will be successful. By cheering the mind you strengthen the body: by raising the spirits you prepare the body to receive all those good effects which change of climate can afford it.

It is, then, obvious that beneficial results may be expected from a change of climate, and in order to ensure all it can afford the energies of the invalid himself must be enlisted: for although a patient may leave his home sanguine in the hope that he will return to it with the "mens sana in sano corpore", yet he must not be allowed to indulge in the idea that climate will do everything, and that no effort will be required on his own part. "If he would reap the full measure of good which his new position places within his reach", says Sir James Clark, "he must trust more to himself and to his own conduct, than to the simple influence of any climate, however genial." One great advantage to be derived from change of climate, is, that by its adaptation to the condition of the invalid it permits him to enjoy a greater amount of out-door exercise, and to partake more abundantly of the pure, fresh air than the temperature of the climate of his usual residence would allow: and it cannot be too strongly impressed upon his mind that air

and exercise are the principal agents by which a change of residence is rendered effectual. Although we have admitted the probability that the atmosphere itself exerts some peculiar influence on the condition of the system; nevertheless in whatever condition an invalid may be placed when resorting to this remedial agent, let him always bear in mind that it is not active in the cure of disease, and that it will not of itself restore him to his pristine strength, or if habitually delicate, it will not of itself endue him with health and strength, nor grant immunity from his special affliction: but that it will afford him every opportunity for improvement; will aid his own efforts and energies, and will present facilities for carrying out more extensively those remedies which are best calculated to ameliorate his condition, and of which he was unable to avail himself in his own locality. This admonition must be carefully inculcated in all cases, whether the patient be a delicate child, a consumptive adult, or a gouty octogenarian.

"All the circumstances", says Sir James Clark, "requiring attention from the invalid at home should be equally attended to abroad. If in some things greater latitude may be permitted, others will demand even a more rigid attention. It is, in truth, only by a due regard to all these circumstances, that the powers of the constitution can be enabled to throw off, or even materially mitigate, in the best climate a disease of long standing".

Change of climate will almost invariably call for a change of Diet- and the invalid must submit to eater, not in accordance with his desires, but with the powers of his digestive system. It must be born in mind that the nervous system becomes more excitable after a removal to a warmer climate, so that Stimulants should then be taken with greater caution. Of course a diet suitable to the condition of the patient will be prescribed by the physician previous to his departure; and this should be strictly adhered to. It is of great importance to pay particular attention to this prescription,

because it is one which is beset by many temptations: the change of scenery, of society and of the entire mode of living are so apt to lead the patient into a state of forgetfulness and to incite him to commit excesses which are highly injurious; for although there is

"Nothing so foreign but th'athletic mind
Can labour into blood";

yet the invalid should bear in mind that,

"the keen apetite will feast beyond
what nature well can bear".

and should cautiously avoid oppression of the digestive powers, which, even in tolerably strong people, is a source of much annoyance and temporary indisposition. Regularity in the time of taking the different meals is highly essential, and an early dinner is on the whole the best, provided there is a sufficient time allowed for repose after it. If he has been accustomed for a length of time to dine at a late hour the change should be made gradually, otherwise the appetite may fail altogether which is inconvenience = bly worse than the late dinner. As a rule the greater part of the days work should be achieved

before this meal is taken; and above all, it certainly ought not to be taken when fatigued. The necessity for suppers may be entailed by early dinners which is, in a measure an evil consequence; they should, however, when called for, be of a light digestible nature, and should always be taken at least from one to two hours previous to retiring to rest, so that digestion may be at least partially accomplished before there is too great a relaxation of the system, or the invalid will probably be admonished through the night by various uneasy sensations, and learn by experience that his stomach will not bear being taxed "with feasts too late, too solid or too full."

The subject of <u>Clothing</u> is to all one of importance, but to invalids especially it should be one of serious consideration. The manner of clothing is dictated by fashion rather than by the constitution of the individual. The strong and healthy may scout the idea of protecting themselves against vicissitudes of temperature, and, like the renowned Tam o Shanter, "never mind the storm a whistle", but even with these salutary precautions should not be entirely disregarded.

Invalids, however, are more "tremblingly alive" to these vicissitudes and should therefore be ever on their guard and have proper clothing ready to suit every emergency. Of the materials best adapted for clothing, woollen fabric next the skin is of all the most important. It affords warmth to the body by its thickness and by its low power of conduction; whilst by its porosity it permits of the easy escape of the insensible perspiration and readily transmits the perspired humours to the superincumbent garments, and thus it offers advantages very superior to those of linen: indeed woollen clothing should be constantly worn next to the person & should not be entirely relinquished even in Summer, though during the warmer months its quality may be reduced in thickness. Children, and more especially those of a delicate constitution, require to be warmly clad. "A child", says Dr Thompson, "should be kept warm by clothing from the neck downwards"; and a golden rule was laid down by John Hunter as to the best method of rearing children, which was to give them "plenty of milk, plenty of sleep & plenty of flannel"

* "Methods of Improving Health".

The subject of clothing, however, is one requiring the attention of the adult and of the aged as well as those who are solicitous for the welfare of children; and unless this consideration is paid to it the influence of climate will be rendered totally inefficient as a remedial agent, if not, indeed, positively detrimental.

Dr Graham* has given the following excellent rules on the subject of clothing:-

1st That the articles of clothing should be made of soft or pliable material, so as not to obstruct the free and easy motions of the limbs, or the circulation of the fluids in any part of the body.

2nd They should be made of such a shape, as to be comfortable from their ease.

3rd They ought not to be warmer than is necessary to preserve the body in a proper degree of temperature.

4th Our garments, more especially those next the skin, should be made of substances easily cleansed when necessary.

5th They should be suited to the constitution and age of the individual.

It must be remembered that in Britain only a very short season is available for wearing a less amount of clothing than throughout the rest of the year; perhaps the months between May and September are the only ones which can be trusted in this respect; the winter, and particularly the early Spring months require to be especially guarded against. Having by a due attention to diet and clothing, protected himself as much as possible from any prejudicial tendencies, certain of which are attached to every climate however genial it may be, it behoves the invalid in the next place to apply the advantages afforded him in the way of out-door exercises. A daily exposure to the influence of the atmosphere is essential; and if combined with a moderate amount of exercise will be productive of great benefit. It is to be remembered that sudden transitions of temperature are to be avoided as being highly injurious and care should therefore be taken to have the apartments of the invalid regulated in

temperature to the surrounding atmosphere. This, indeed, is an object of so much importance that to introduce a few remarks on the preservation of an equable in-door temperature may not be considered out of place. The ignorant are very fond of what is called 'Snugness' that is, a small room with every available channel for the entrance of fresh air carefully closed up, windows shut all day, a large fire and closely drawn curtains. Air and light are the two great necessaries for existence. The plant and the flower droop, sicken and die if deprived of the wholesome light and fresh recurring air. But the human flower, when weakest, and when it most seeks the sunlight, is often, through the tyranny of ignorance, imprisoned in a deadly darkness. Many an invalid I have seen, cooped up in a chamber of the most inadequate size - pale, heavy, dispirited - leaning with shivering frame over a large fire; and the door

* "The Undercliff of the Isle of Wight."

and windows almost hermetically sealed, breathing an atmosphere of the worst description being almost entirely wanting in 'vital air'; ventilate the apartment; let in the light upon the body and spirits, for it revivifies both, and the invalid seems almost immediately to acquire, fresh strength, fresh life, fresh energy. Dr Martin, in his able work*, has pointed out the necessity of regulating the in-door temperature "to approximate in such a manner to the changing atmosphere without, that, while we guard against the injurious effects of cold, we also avoid the almost equally pernicious consequences of an over-heated room." He has drawn up the following table which shows what he conceives should be the difference between the two temperatures.

Temperature out of doors	Temp^{e} in-doors
60°	60°
55°	=
50°	59°

* "Popular Treatise on Diet and Regimen"

45°	58°
40°	57°
35°	56°
Freezing Point 32°	55°

To enjoy thoroughly the pure fresh air of any genial climate Exercise must be the means employed to draw the patient into it. Never mind how little can be accomplished at first; let that little be encouraged and carried on with determination, and although the progress may be slow nevertheless in time the sphere of its operation will gradually become enlarged and in due season he will find himself arrived at that stage of 'comparative health' wherein he may avail himself of all the advantages derivable from the following system laid down in Dr. Robertsons valuable treatise.* "The change of air", he says, "which in cases of comparative health I would especially advise, is that embraces in constantly moving from place to place, taking as much personal exercise as

possible. To taste all the pleasures which the best and most healthy of all kinds of travelling affords, you need not leave your native land. It is this sort of travelling (walking on foot as far as possible or convenient); this total removal from ordinary and every day habits; this constant exercise; this continual change of air which does most good: that, if the man is in moderate health, gives vigour to his system, freedom to his limbs, and clearness to his mind, which will, like magic, uproot many a case of long continued dyspepsia, and cause many a chronic disease, threatening to degenerate into something worse, to be no longer felt." Exercise of the body, equally with exercise of the mind, is a point which requires a nice calculation as to its quantity, quality, and the period best adapted for it. Want of a proper amount of exercise whether of body or mind, engenders a multitude of disorders by inducing langour,

debility, slothfulness of the body; and of the mind an inability to overcome and keep in subjection the more inordinate moral and mental emotions, and to maintain itself "superior to the coarse gratifications of sense". On the other hand, exercise when too long persisted in, when of too violent a nature, or mistimed, will of itself become the originator of much disorder. Exercise when carried to excess enervates the system; it wearies the organs of circulation, respiration and digestion, and this fatigue is not duly counterbalanced by the rest which follows; not only is it powerfully inimical to the restoration of health, but it is even an active cause of predisposition to disease. So with undue prolongation of mental applications, positive injury arises modified by the intensity of the application, from occasional dyspepsia, through a long series of morbid conditions such as mental hallucinations, sleeplessness, frightful dreams, or delirium, even to insanity.

But when mind and body are both exercised in a wholesome and moderate manner, then their functions are performed in a way best calculated to ensure health and happiness. Dr. James Johnson* observes, "I am convinced that a journey of this kind in which mental excitement and bodily exercise are healthfully combined, would not only render many a miserable life comparatively happy, but prevent many a hypochondriac and dyspeptic from lifting his hand against his own existence. It would unquestionably preserve many an individual from mental derangement". And in another part of the same work we read. "I would recommend some of my fair country women, who have leisure as well as means, to improve the languid state of their circulation and the delicacy of their complexion, by a system of exercise in the open air, which will give colour to their cheeks, firmness to their muscles, tone to their nerves, and

energy to their minds". The exercises and recreations of children, especially of the gentler sex, are too much interfered with and limited by the customs of society. The skipping rope, the ball and the hoop are in too many instances supplanted by the piano, the pencil, or the needle; the consequence is that circulation and respiration are curbed and the action of the skin almost entirely checked, as, indeed, are all the secreting functions, and hence it is we see so many pale and drooping forms struggling, how often unsuccessfully, to gain support for their rapidly developing frames, and contending with a like result against the numerous diseases to which youth is liable. "Boys", said Sir Astley Cooper, "will take exercise, and thus are less liable to this complaint (Scrofula), whilst girls are not allowed, and, if predisposed to it, are almost always attacked by it." And again, Abernethy in his "Lectures" quotes the words of Hunter on this subject; he says, "I remember our Hunter saying, you should dress

your children lightly and loosely, let them run about, and exercise all their muscles equally and then they will not grow awry". Having digressed thus a little from the subject of cure to that of prevention, which, indeed, is often all "the best cure", I return to the consideration of exercise as adapted to the invalid, to be used as an auxiliary to climate in its labour as a remedial agent.

The different kinds of exercise are worthy of a brief consideration; some, indeed, scarcely deserve the name. We have an example of this in riding in a carriage; and yet this may be the only method of locomotion which the condition of the invalid will admit of, and consequently, poor though it be, and in many instances forming a positively hurtful luxury, it must be admitted into the list of exercises; it possesses this advantage, however, that it draws the invalid into the open air: and care should be taken in these cases, especially if the invalid cannot bear an open window,

that the carriage be not crowded, and that there be a proper ventilation established, otherwise very little, if, indeed, any good of the rest, will result. Any ill effects, which may have been caused by the journey or other circumstances, having been counteracted by a proper attention to diet, the condition of the various secretions, and some other matters which it is necessary to have especial regard for after a change of climate has been effected, the invalid should proceed to take advantage of his improved position by undertaking some kind of exercise which is most agreeable to his taste and best adapted to his condition; and on this point the following rule should ever be inculcated, viz:- to,

> "Begin with gentle toils; and, as your nerves
> Grow firm, to harder by just steps aspire.
> The prudent even in every moderate walk,
> At first but saunter; and by slow degrees
> Increase their pace".

Walking is generally admitted to be the best mode of exercise; it is marked with

an amount of independence which can never be attached to any other mode of locomotion; and moreover it calls all parts of the body into activity; it accelerates the circulation and thereby occasions an increased respiratory action; it promotes the healthy action of the skin, and invigorates the entire system. Nothing, perhaps, can be more delightful, or tend more to elevate the spirits and to give animation and strength to the body than walking in a genial climate through pleasant scenery and with a cheerful companion. It is, in truth, a matter of great importance that the scenery and place of exercise should be agreeable, for we have elsewhere noticed how trivial circumstances sometimes have a very depressing influence on the sensitive minds of invalids; and scenery is one of those most likely to have such an effect if it be not of a fascinating description, and, indeed it should under any circumstances be frequently changed, for few things are better calculated to depress

the spirits than monotony. In walking as in all other exercises fatigue should be anticipated; we have seen that an undue amount is pregnant with consequences scarcely less injurious than the entire want of it. Riding is, perhaps, but little inferior to walking. It does not, however, imply so general and thorough an exercise of all the muscles of the body, but in its turn it possesses some advantages which are not obtainable from walking, especially in cases where there is any obstruction of the viscera, or a sluggish state of the secretive organs: care, however, should be taken to maintain the temperature of the body, more especially of the feet and legs, otherwise a check of skin action may prove an injurious offset to its numerous advantages. Dr. Reid has the following in support of this excellent exercise. "Walking," he says, "is one doubt best adapted to a state of unblemished health or unimpaired vigour; but for the feeble and hypochondriacal, or those who are affected with any

visceral obstructions or disease, riding on horseback is, for the most part- preferable to any other kind of exercise. Horse exercise is particularly calculated to remove the obstructions and to brace the relaxed energies of the frame. I have frequently seen instances of broken up Spirits, and apparently ruined constitutions, in which an altogether unexpected restoration to strength and cheerfulness has been effected by horse exercise, when almost every other method of recovery has been tried without any sensible advantage". Other kinds of exercise according as they are adapted to the age, taste, and sex of the invalid may be usefully resorted to. Gymnastics deserve especial notice but should not take precedence of out-door exercise, and should be undertaken cautiously. Fencing, cricket, tennis, quoits, rowing are all so-called methods of restoring and maintaining health, but many prove equally injurious when practised indiscriminately. It is of great importance that the most-

seasonable hours should be selected for taking exercise. Few people of weakly habit can bear to walk out before breakfast, and indeed beyond the uncomfortable sensations which it causes at the time, such as fatigue, nausea, headache and such like, it is apt to produce more serious consequences; for the air is often loaded with moisture, the result of evaporation of the dew, and this is by no means a desirable condition of air in which to expose an invalid. The periods best adapted to the generality of invalids are, perhaps, a little before noon; again after the extreme heat of the day has passed and before sunset, thus avoiding the damps of the morning, the heat of noonday and the dew of the evening; and probably by retiring before daylight has ceased to exist its influence on the vegetable world other impurities of the atmosphere may be avoided. Out-door exercises are sometimes impracticable, as in wet days, when some in-door exercise should be substituted: perhaps some light, easy gymnastics, or, what in some instances is considered to be both agreeable

and beneficial, reading aloud which affords simultaneous exercise to the mind and body. It is, in most cases, of vital importance that the invalid should not be left to a dull inaction, which is apt to bring on a nervous and hypochondriacal state, and to retard, if not to obstruct, his recovery. Let him, for instance, be advised to adopt such an amusement as the Aquarium, or to undertake moderate excursions to remarkable points of scenery, or to engage in the study of the phenomena of natural history.

We have elsewhere considered the great importance of healthy skin action. It must not be supposed that the skin is only intended to serve the purpose of a covering to the frame, to protect from the rude touch of external objects, or merely to add beauty to the human form: in all its apparent simplicity it has onerous and momentous duties to perform. We have seen (p. 49.) that by means of it not less than thirty-three ounces of effete

matter are eliminated from the system during twenty-four hours; now the entire performance of this duty must devolve on some other organ, or organs, which have already a certain amount of labour allotted to them, if from any cause the action of the skin is suspended; or, failing to find a fellow labourer both capable and willing to undertake this additional task, the greater portion of this refuse matter must remain in the blood and give rise to a countless train of disorders, any one of which is sufficient to cause disease, and, perhaps, to shorten life. The means of avoiding such untoward circumstances are within the reach of every one; but especially in the case of an invalid these rules should be strictly inculcated.

The use of water for the sake of cleanliness is a point scarcely worth dwelling upon; the above facts are sufficient to manifest its importance. But baths and ablutions of various

kinds have other uses besides that of merely cleansing the skin. Whether bathing has any specific influence in the removal of special disorders is a doubtful matter; but that it has a powerful general beneficial effect in many cases may be unhesitatingly asserted; it rouses the energies, gives tone to the system and revivifies the whole frame; and, above all, it renders the vicissitudes of weather to which we are so much exposed less hurtful by preparing the body to undergo them: for if the body be tutored into bearing the powerful shock of the shower bath or douche, the change, whether thermometrically, barometrically or hygrometrically, must be very much greater than any we usually experience in our climate, before it can exercise a baneful influence.

Baths are of various kinds, suitable for different constitutions, ages, or sex. Thus we have hot, cold, tepid, plunge, shower, vapour, or the douche: or even sponging the body is in many instances

highly beneficial, and is practised with great advantage in weakly constitutions. Sea bathing is that which is generally adopted, besides which there are baths of mineral and medicated waters. The readiest form is the cold bath, which by some may be resorted to with great benefit; but to many it proves too powerful, the shock not being followed by a moderate reaction but by one which, though delayed for some time, is in the end too violent: To avoid this tepid water may be used: but the method, which of all others is the one most likely to be found generally beneficial, is that of sponging the body every morning with cold or tepid water. It purifies the skin, imparting to it a healthy glow and rosy tint, an indication of a determination of blood to the surface which is likewise felt in the easy play of the internal organs, and the general sprightliness and alacrity with which the business of the day is commenced.

Salt water, or, where this cannot be had, the addition of a saturated solution of Sea-Salt will be found advantageous, and generally more grateful to the bather: it is more stimulating to the surface, and there is less liability to take cold after its use than when fresh water is employed. "Persons immersed in sea water, and especially in saturated brine, for some time together, preserve the lustre of the eye and the ruddiness of the cheek, longer than those in fresh water, of an equal temperature, and such persons exhibit the vital reaction stronger when removed from it" (Currie). But although baths are in many instances highly useful in the restoration and preservation of health, yet they are not to be used without proper discrimination: nay, even in the majority of cases where actual disease exists, especially if there be any inflammatory symptoms in connection with the disorder, bathing will prove not only useless, but positively injurious, and

upon the whole it- (I speak of Sea-bathing especially) is perhaps better adapted to those who seek the Sea-side to lay in a stock of health to serve them in the future. I quote the words of that celebrated Physician Dr. James Johnson on this subject. He says, "The range of cures performed by this remedy (bathing) in actual diseases, is, in my opinion, extremely limited. Cold baths of any kind cure organic changes (constituting disease) in the brain or its membranes - in the lungs - the heart - the stomach - the liver - the bowels - the kidneys, or any other viscera? They will not. Nay, they are by no means always safe in disordered function of any of those parts, when that functional disorder is considerable. It is that vale = tudinary or weak state of general health, so widely diffused among all classes of society, where there is no evident, tangible, visible, cognizable, disease of structure, that bathing, especially Sea-bathing, is so valuable a restorative of health, and so potent a preventive of corporeal maladies." He adds,

* "Johnsons English Spas".

"it is in those countless deviations from ~~from~~ health, resulting from the wear and tear of body and mind, in the complex state of society, as now existing, that Bathing, carefully commenced and cautiously conducted, works wonders in renovating the strength and improving the looks*". In connection with this subject may be added a few remarks on a valuable auxilliary to bathing and other promoters and preservers of health, viz:- Friction, whose importance and highly beneficial influence seem to be but little appreciated. It invigorates the system, promotes perspiration, cleansing and imparting to the skin a healthful and ruddy glow; it retards in a measure the approach of old age, and would no doubt, if regularly and properly undertaken, add many years to life. The advantages derivable from its practice are amply illustrated in the appearance of the sleek and glossy coat of a well-groomed horse: the more valuable the horse, the more constantly are the flesh brush and curry comb applied and the better is his

* "Quart^y Review", March 1853.

condition. The preservation of his faculties to so great an age, unimpaired, by the Duke of Wellington was attributed to the regular use of the flesh brush accompanied by regular habits and a proper regimen. "It is reported that, with the exception of one eminent friend of his own, older than himself, there was no man in London who gave, morning and night, so much time to the flesh brush".* Dr. Graham recommends its application in the following manner. "We should begin", he says, "with the arms, hands, feet, legs and thighs; and thence proceed to the shoulders, back and breast; the head should be rubbed last of all. The effects of this practice, when resorted to with care and constancy, are more important than can be imagined; and although it cannot be attended with all the advantages derived from exercise in the open air, yet it is the best substitute for more active exertions than can possibly be suggested".

There's a time for all things and there's

a proper time for sleep; and on nothing more than on a due attention to this most necessary of all occupations, or perhaps I should rather say this want of occupation, does the invalid depend for the restoration of his health. Few, even among the strongest, can bear to be deprived of their sleep how much more, therefore does it behove the weak and delicate to have regular hours for rest.

When the brain and nervous system have continued to exercise their functions for a lengthened period, it becomes necessary that there should be an interval of repose in order that, that process of destruction of their substance which has been going on whilst the body was in a state of activity, may, during the temporary suspension of their functions, "be replaced by nutritive regeneration", and thus be enabled on the morrow to resume its exercise. So that as a watch requires a key to wind it up in order that it may keep pace with fleeting time, so the pillow becomes the key for winding up the brain and

rendering the whole "machina animalis" fitted to renew its labours. This state of things, this "sweet necessity" for sleep is beautifully described in the "Conspectus Medicinæ Theoreticæ" by the late Dr. Gregory who, speaking of the animal functions, says, "Omnia vero omni tempore ad has functiones valemus; longa enim aut valida sive animi sive corporis exercitatione utrumque vires citius exhauriuntur. In hoc autem statu brevi moneamur, et tandem dulci necessitate cogamur, labores omnes et voluptates quanter intermittere curasque deponere et nos metipsos defessos et hebescentes somni amplexibus committere; cujus gremio foti et refecti, resurgamus denuo vegeti et alacres et ad omnia vitæ munera aptissimi."

"The amount of sleep required by man", says Dr. Carpenter, "is affected by so many conditions, especially age, temperament, habit and previous exhaustion that no general rule can be laid down on the subject". Children require much more sleep than adults, weakly persons than strong ones, women than men. In old age, again, sleep becomes almost the natural state, for the lives of the very aged seem to be

one continued dose: "as if, in consequence of the waste of energy of their nutritive operations, a very long period of repose is necessary to repair the waste which takes place during their short period of activity".

It is as injurious to the system, on the one hand, to deprive it of any part of the sleep which it requires, as it is debilitating and slothful, on the other, to indulge it with an excess. "It is worthy of particular remark", says Dr Graham, "that the sick and weakly seldom require more than eight hours and a half or nine hours at the most, and will rarely, if ever, fail to be injured by longer indulgence. A sufficiency of sleep is powerfully restorative, but I am fully persuaded that an excess, of even an hour, is highly detrimental". The invalid should always make it a rule, and adhere firmly to it, to retire early to rest. Early rising will soon beget early retiring, even as sitting up late at night engenders the pernicious habit of lying in bed hours and hours after the sun has risen. Perhaps the best hours for an invalid to devote to sleep are those between half past ten at night and half past six to seven, according to his

strength, in the morning. If he habituates himself to this, he will sleep well through the night and regain it all, but no more. If his sleep is disturbed by night-mare or dreams, let him look to his diet and the atmosphere of his bed-chamber, and these being properly regulated, he will rest through the night and rise in the morning refreshed and invigorated "et ad omnia vitae munera aptissimus".

Part IV.

On the climate of certain Localities of England.

Bath. a city situated at the south-eastern extremity of Somersetshire, stands in a beautiful valley on the banks of the Avon. It is surrounded by hills of considerable height which shelter it from the N. and E. winds (the latter of which are prevalent), though it is exposed to the W. Bath is a place of agreeable resort for invalids during the Spring and Autumn, and even in winter the temperature is so mild as to admit of abundant out-door exercise. during the Summer, however, the heat, especially at the lower part, in the neighbourhood of the Springs, is frequently oppressive and necessarily relaxing. (Lee). Bath is represented as being 4° warmer than London in January and about 6° warmer in February and March. (Clark). It is visited by a good deal of rain but from the position of the town and the quality of the soil the water does not accumulate on the surface, so that out-door exercise may be taken very shortly afterwards.
Dr Field, of Bath, says, "It is certain the climate of Bath is damp: the South-westerly breezes, as they pass over the hills of the neighbourhood, deposit a considerable quantity of the water which they waft from the Atlantic."

Dr Sunstall, says, "The prevalent winds are westerly, so that those who come from a more bracing air require out-of-door exercise otherwise their health fails." In speaking of the class of patients to whom this climate might prove beneficial, Dr Lee, observes, "A climate of this nature would be well adapted to remedy several morbid conditions of the system, marked by irritation or undue nervous excitation, especially diseases of the respiratory apparatus, in which this character predominates, and where a mild air and a position sheltered from cold winds are indicated. It would also be well suited to many patients affected with disorder of the digestive organs, attended with local or general excitation; while to other cases of an atonic character, as also to scrofulous, lymphatic, or weakly subjects with languid circulation and general torpor of the functions, it would be less beneficial than an atmosphere of a more bracing kind, with elderly people, as has already been observed, it generally agrees well, and many attain to a very advanced age, the generality of young and middle-aged healthy persons would, however, experience more or less of the relaxing effects of the climate, after a prolonged sojourn in the lower parts of the city." Bath possesses thermal springs whose range of temperature extends from 109° to 117° they are three

in number. The waters are chiefly used as baths, though sometimes in union with this mode of treatment, they are recommended to be taken internally. According to the analysis made by Sir Charles Scudamore some few years ago, the following ingredients were ascertained to exist in the Bath waters, amounting in all to 14 grains of solid matter to the pint:-

Muriate of Lime	1-2 grains
" " Magnesia	1-6 "
Sulphate of Lime	4-5 "
" " Soda	0-4 "
Silica	0.2 "
Oxide of Iron	0.014 "
Loss	0.5
Total ..	14.0

Carbonic acid gas a little more than a cubic inch in the pint.

Dr. James Johnson considers that the medicinal virtues of the Bath waters do not exist in any of the chemical ingredients hitherto discovered in them, but probably to some other constituents which chemistry has up to the present time failed to detect. Placing Gout at the head of the list, Dr Johnson gives the following train of disorders as likely to be relieved by the Bath waters:-

Rigidity of Joints - Rheumatism - Paralysis. Dyspepsia - Hypochondriasis - Jaundice - biliary derangements - hepatitis chronica - jaundice - uterine obstructions and debilities - chlorosis - amenorrhoea - leucorrhoea - hysteria - and even sterility itself, have found benefit from the Bath waters, if there be any faith in the records of medicine. Various cutaneous affections are annually sent to Bath - especially the varieties of lepra and psoriasis, and the reputation of the waters in this tormenting and frontless one class of human ailments rests on ample experience." According to Sir Charles Lendamore, the waters are best adapted to those cases of Gout "in which there is great deficiency of nervous energy in the muscles, joined with a languid circulation in the extremities, and stiffness with aching pains in the joints upon every motion; where the tendons are rigid and thickened, the ligaments wanting in elasticity and the Bursæ distended; in which there is an external coldness, the feet frequently cold, the limbs seem to want animation and require a high degree of stimulus". Of Rheumatism, Dr Lee says, "The Bath waters have not been wanting in their share of praise for their advantages in this disease, and no doubt great benefit may be expected from them in the more chronic forms of this disease, especially when attended with shifting pains, stiffness, rigidity, and partial contraction of the joints, as also in

that complication called rheumatic gout."
Dr Summers speaks highly in favour of the waters in cases of paralysis: out of ~~380~~ 310 admitted into the hospital, he says, 208, were cured or much better; 99. no better one dead; remain in the house, 3. "From hence it appears, that more than two thirds were either cured or received great benefit, and that only twelve died in the space of nine years. All these patients were bathed twice a week and many of them three times. And what is very remarkable is, that of those who were cured or discharged much better, about 30 were more than 20 years old, fifteen of whom were turned of 50, and five were 60 and upwards".
Of dyspepsia, Dr Falconer observes, "The recovery in such cases is particularly remarkable for its taking place so quickly after the commencement of the trial of the remedy. A few days will frequently work such a change in the situation of the patient as would be scarcely credible, were it of less common occurrence. The appetite is often restored altogether, the wandering spasms and pains cease, the natural rest-refuses, and the spirits are raised to their proper pitch. The strength likewise improves daily, and the natural secretions and regularity of the body in point of evacuations are restored." The environs of Bath afford sheltered walks and rides of a fascinating description.

Beaumaris. A market-town of Tyndaethwy, island and county of Anglesea, North Wales; occupies a picturesque position in the bay of Beaumaris on the northern entrance of the Menai Strait. There are public baths and reading rooms. The Caernarvon mountains, terminated by the lofty Snowdon, are in view. It has a southern aspect, having well sheltered walks affording ample opportunity for outdoor exercise. It is a gravelly district, the atmosphere being of a very bracing nature. It is recommended in convalescence from debilitating diseases. It should be avoided during the spring months. The easterly winds prevail and are especially by those suffering from Pulmonary or Bronchial affections. From June to October inclusive, are the months during which it affords the most genial climate.

Bournemouth. lies on the shore of a beautiful bay, formed by Hengistbury Head on the East, and Poolbeck Hills on the west. It is well surrounded with pines and evergreens; possesses a sandy soil; and is delightfully sheltered from cold winds. "The most prevailing winds," says Dr. Aitken, "by far are the westerly. Before the wind from the Atlantic arrives in this neighbourhood, it has already crossed over nearly 200 miles of land, and passed over many hills, and thus been freed of a considerable portion of its abundant moisture". "The two descriptions

of persons to whom this climate offers great advantages, though neither may labour under actual disease. In the first place, to persons who have long been resident in hot climates, and whose constitutions have consequently undergone changes that render them particularly susceptible of morbid impressions, resulting from the cold and dampness that prevail over by far the greater part of Britain. In the second place, the young who are of a weak habit of body."

Bournemouth appears to me deserving of a more extensive patronage than it has yet received. I consider it offers singular advantages to invalids affected with disease of the lungs, or suffering from general debility. Its great drawback is its want of amusements and resources of recreation. It would, therefore, be an undesirable locality for persons of small mental energy or nervous temperament.

Buxton. Buxton Spa is well known to the inhabitants of London, its garden being one of their favourite resorts. The air is of a bracing character, but the locality is not favourable to invalids. The water is sparkling, bitter, and saline aperient. According to the analysis of Messrs Brande and Taylor, a pint contains:-

Sulph: magn:	61.5 grains
Muri: soda	17.5 "
Muri: magnes:	9.5 "

Carb: Lime . . . . 7.5 grains
Carb: Soda . . . 2.0 "
Total 98.0 grains

Carbonic acid gas in cubic inches 7.5.

Dr James Johnson, remarks on their medicinal effects that, "with the exception of acute inflammatory affections - disposition to haemorrhages or piles - diarrhoea - general debility, and purely nervous complaints - and tendency to apoplexy - there are very few maladies that can be aggravated by such a Spa as Beulah. Here we need have no apprehension of the Bad Sturm Vundled up so often by the more potent and stimulating waters of Germany, and where auxiliary aperients are so much neglected".

__Brighton__. The climate of Brighton is of a twofold nature; being in one direction, easterly, dry, keen and bracing; whilst towards the west it is considerably warmer and milder. The former is beneficial to those of a relaxed habit of body, whilst the latter affords, to delicate constitutions, and to those in whom there is a tendency to chest affections a climate more congenial to their feelings. The town is remarkably well drained into the sea, and water cannot lodge on the surface so that exercise may be taken almost immediately after a heavy and continued rain. Towards the East end of the town the cliffs rise to a

* "Horsfield's History of Surrey".

greater height, and are composed altogether of chalk. "The soil is calculated to give a temperate air - a thin bed of clay is not unhealthsome. Clay does not become the principal part of the soil till we go farther west". The water is good but from its proximity to the sea it is occasionally brackish, though this, I believe, rarely occurs. The prevalence of winds is as follows - In 243 days. SW. 106; WNW. 34; W. 31; NE. 29; S. 17; N. 11; E. 11; SE. 4.

"The climate", says Sir James Clark, "is singularly well suited to young persons, particularly females suffering from a deficiency of red blood, and the debility and deranged functions consequent upon, or connected with, such a state of the system. All derangements of the constitution indicating the use of iron will be benefitted in a marked manner; and in convalescence from acute diseases, and the debility consequent upon long confinement, no seaside climate, with which I am acquainted, is to be compared with that of Brighton."

"Those, however, who are susceptible to atmospheric changes, and who require a mild genial winter climate will do well to remove in the depth of winter to a more sheltered position". (Lees). There is a chalybeate spring at the western extremity of Brighton; the water contains little or no free carbonic acid, and of sulphate of iron about 1/2 grains to the pint. It is recommended as a temporary residence for children, and for

chronic diseases of the chest. "It is counter-indicated in gastric dyspepsia, intestinal or biliary derangements, irritation and dryness of skin, tendency to venous congestion, renal disease &c".

Buxton. Situate in a lofty part of Derbyshire is one of the most agreeable of English watering places. It enjoys a pure pure atmosphere having a bracing tendency. Atmospheric variations occur occasionally to a great extent. It is subject to heavy falls of rain at times, which, however, are disagreeable only so long as they last, for from the nature of the soil the water immediately sinks through leaving the surface perfectly safe for exercise. The springs, which appear to have been known to the Romans (the wall of an old Roman bath may still be seen), have for ages past enjoyed a medicinal reputation; they are plentiful and afford an abundance of water; There are several commodious baths both private and public. The temperature of the water at its origin is 82° F. There is also a chaly beate spring but the water is very slightly impregnated. Sir Charles Scudamore, however, remarks, "we ought not to estimate the powers of any mineral water merely in reference to the weakness of its impregnation with metallic, saline or gaseous ingredients. The Bath water contains only one fifth of a grain of the oxide of iron in

a sulfur, held in solution by carbonic acid; and yet do we well call in question its efficacy as a stimulating chalybeate." The chemical composition of Buxton waters has been ascertained to be as follows:-

Muriate of magnesia . . .	0.58 grains
Muriate of Soda - —	2.40
Sulphate of Lime - - —	0.60
Carbonate of Lime . . —	10.40
Extractive matter - - -	0.50
Loss. - - - - -	0.52
Total per Gallon	15.0

Buxton is much resorted to by invalids suffering from Gout and Rheumatism or a chronic form. It was the opinion of Sir Charles Scudamore that these baths would be found of peculiar advantage "in a chronic state of the constitution unattended with fever, when the various textures concerned in muscular motion are weakened to such that the patient experiences lameness, stiffness and irregular pains, more particularly in damp weather, or from a change of wind to the East." Elsewhere he adds, "it certainly happens that, simple as it appears in composition, it does prove inconveniently stimulating to some persons of full habit and of the sanguineous temperament." The waters have also been recommended in cases of Dyspepsia. The environs of the town afford delightful walks and picturesque & romantic scenery.

Cheltenham. is situated at the base of the Cotswold hills, in the rich valley of the Severn. Its waters are of great celebrity, and its climate is such as to render it highly favourable for invalids suffering from pulmonary affections or dyspepsia, or invalids accustomed to Tropical climates. In the winter it would not be found suitable to persons affected with rheumatic disease, "Convulsive complaints in children of torpid habit & languid circulation, nervous hypochondriasis &c. Dr Gibney, a resident physician, says, "the town is so sheltered from the north and east winds, that consumption and acute coughs are less prevalent than at other places and the hills are at such a distance as to attract a great proportion of the moisture which would otherwise impair the salubrity of the air of the town. The winds most common are from the south and west, which are esteemed the least prejudicial to health; these winds prevail nearly two-thirds of the year". According to the "Cheltenham Guide" the general temperature is less subject to extremes of heat and cold than that of London. It gives as the average relative prevalence of winds during 7 years - from 1830 to 1837. East-wind, only 28 days; West, 45; North, 55; South, 50; North-west, 33; and South-west, 97; - evidently demonstrating a very favourable climate for dyspeptic invalids. July and August, however, are months in which Cheltenham should be avoided. The Spring and the winter are its most

genial seasons. The Cheltenham saline waters abound in chloride & sulphate of soda. A great variety, however, exists in the mineral ingredients, so that the physician can generally select a particular spring as most favourable to patients suffering from a particular disease. Cheltenham also possesses two very powerful chalybeate springs, for the analyses of which, and for a more lengthened and interesting account of the waters I must refer the reader to that very excellent little work by Dr James Johnson, entitled "English Spas".

Clifton. Clifton, and the advantages which it offers to invalids, require little notice. Perhaps no place in England is more deservedly popular among the medical profession. Its situation is eminently picturesque, and affords the most charming panoramas of woodland and open scenery, of the abrupt rocks that flank the valley of the Avon, and the broad beaches that cover the shores. The air is fresh, bracing and vigorous: the soil dry, resting on a limestone substratum: while the climate is genial and not too humid. Sir James Clark speaks of Clifton in very favourable terms. "In its local advantages and geographical position, Clifton, yields, perhaps, to no place in the kingdom as a residence for a large class of invalids. Within its own limits it affords a sheltered winter and an open, airy summer residence, while it is surrounded by numerous places of convenient and agreeable resort in the first season, suited to the various

classes of persons who may seek its shelter during the winter. Compared with the South and South West coasts the Spring is the period of the year in which this climate appears to the greatest advantage. For consumptive patients and those labouring under irritable affections of the bronchial membrane, the softer and more humid air of Devon will be found more soothing; while for invalids whose constitutions have suffered from long continued derangement of the digestive organs, or a congested state of the mucous membrane, with copious secretion, and also for young sensitive persons, and those of relaxed body generally Clifton will prove a preferable climate". The baths are now in little vogue. They are efficacious in dyspeptic cases, and of some benefit in affections of the kidneys. Salts of lime predominate.

Dawlish. As a place of winter resorts for invalids afflicted with pulmonary complaints, Dawlish deserves particular commendation. It is well protected from the winter winds. It lies about 3 miles from Teignmouth in a sheltered valley that opens out upon the shore. It is completely screened from the N. & N.W. though only partially so from the East. The air is mild and the soil quickly dries. In the Spring the east winds prevail, to which it is much exposed: there are some very pleasant and protected walks in the neighbourhood. The months available at Dawlish are December, January and February.

Dover. Is chiefly resorted to as a fashionable summer sea side

locality. It is colder than Hastings, and less suited to delicate constitutions. Persons suffering from nervous affections and chronic dyspepsia might here find some relief; but generally speaking it is ill adapted to invalids.

Exmouth. Near Exeter, has a western aspect facing the Estuary, and is sheltered on the East and North by a considerable acclivity. It enjoys a drier climate than most other points on the Devonshire coast, but suffers from the South West gales. Affections of the liver, Uterine disorders, Chronic &c., might be benefitted by its climate in the Autumn and winter.

Harrogate. So much patronized by the residents of the Northern counties. It is built on a gentle eminence about 20 miles from York; has a fresh bracing atmosphere, and is surrounded by agreeable Scenery. It is divided into High & Low Harrogate. Their names indicate their position with reference to each other. Harrogate is chiefly resorted to for its waters, which are of ancient repute, rather than for its climate. They have been divided by Dr Hunter* into four classes. "1., Springs impregnated with Sulphuretted Hydrogen gas, and Saline matters. 2. Saline Chalybeate Springs. 3., Pure Chalybeate. 4., Springs containing earthy salts with little iron and no Sulphuretted hydrogen." "The complaints", says Dr Lee, "in which these springs may be more particularly recommended are some deranged states of the digestive organs, with vitiated secretions, and an inactive state

of the liver and bowels; hemorrhoidal tumours from obstructed circulation through the abdomen; chronic gout, attended with stomach disorder, and from too free living; and some obstinate cutaneous complaints, in which the baths are most efficient". Dr Hunter considers they would be found effectual in skin diseases - such as impetigo, herpes, prurigo, lepra & psoriasis.

Hastings - One of the most popular of English watering places is Hastings, which rejoices in the possession of a firm, sandy beach; some very picturesque scenery; a mild, bland climate; and a soil which if in itself clayey is laid on a substratum of sand and quickly dries. The prevalent winds are the South and South-westerly: from the North and North East it is effectually screened by its lofty cliffs. According to Sir James Clark, its mean temperature resembles that of Clifton and London; but it enjoys more sunshine, and is less exposed to the biting blasts. Dr Kinig, in his "Medical Review of the Southern Coast of England", considers that the disadvantage of its air is, it is too relaxing for delicate persons, who require a dry air without its being keen. But this can only be in the autumn months.

Dr Harewood states the mean temperature at 9. A. M., to be in November 45°- December 42°- January 44°- February 44°-, whilst; according to Dr Lee, the amount of rain may be thus estimated. In the winter, 7.49 inches - in the Spring, 5.16 - in the Summer, 6.27 - and in the Autumn 12.16.

Sir James Clark is of opinion that the climate of Hastings "is unfavourable in nervous complaints, more especially in nervous headaches connected with, or entirely dependant upon an irritable condition of the digestive organs, such, also in cases where a disposition to apoplexy or epilepsy had been manifested." I should be inclined to recommend Hastings to invalids afflicted with bronchitis and pulmonary diseases. St. Leonards, which is on a mile from Hastings, is less sheltered from the winds, and having a more bracing air would be better adapted to some cases of "Chronic bronchitis, scrofula, indigestion and nervous disorders". The fact is, Hastings and St. Leonards together would suit most classes of disease, the patient removing from one to the other, according to the change of season. There are numerous Chalybeate Springs at Hastings. I append an analysis of a gallon of water.

Protoxide of Iron	4.303	grains
Muriate of Lime	4.978	"
Sulphate of Lime	1.446	"
Sulphate of Soda	3.017	"
Sulphate of Magnesia	4.085	"
Carbonate of Magnesia	4.640	"
Silex	.385	"
	22.857	"

with 18 cubic inches of Carbonic Acid gas, and 5" of Azote. Hastings, however, labours under one great disadvantage, that-

of affording very little scope for outdoor exercise. The parade and the road through St. Leonards being the only protected situations.

Leamington. is situated two miles from Warwick, on the small river Leam. It is a large well-paved, well lighted and lively town. It is cooler in summer and colder in winter than Cheltenham; but is free from sudden changes of temperature, enjoys a salubrious air, and is more bracing in its character. Dyspeptics and Hypochondriacs would derive advantage from its climate.

The springs were famous in the 16th century and are alluded to by Camden, and quaint old Fuller. The latter speaks of them as "two twin springs, as different in taste and operation as Esau and Jacob in disposition; the one salt, the other fresh".

The old well offers the following constituents in a pint of water:-

Muriate of Soda	40.770 grains
Sulphate of Soda	40.398 "
Muriate of Lime	20.561 "
Muriate of Magnesia	3.266 "
	105.995
Carbonic acid	2.103
Azote	0.537
Oxygen	0.075
	2.715

They are well adapted to torpid habits, "to stomach derangement without inflammatory complication, hepatic obstruction, acné

and other eruptions about the face, as also in chronic gouty cases, especially when constipation of the bowels co-exists" (Lee).

Malvern. Great Malvern is situated at the foot of one of the Malvern hills, at one great distance from Worcester. The salubrity of its climate - which in summer is refreshing by cool and pure - renders it in that season a place of fashionable resort. "The air has always been justly celebrated", says Dr Addison, "for its great purity and invigorating quality; the healthiness of its topographical situation has been acknowledged by all who have resorted to it; whilst its salutary and wholesome waters hold out a paramount inducement to those who are suffering from bodily infirmity". These waters are beneficial in cutaneous diseases and scrofulous ulcerations. But the climate of Malvern renders it an unfit resort for invalids affected with pulmonary complaints.

Matlock. Is in agreeable town in the midst of some of the most charming scenery in Derbyshire, situated on a gentle ascent above the Derwent, and surrounded with luxurious woods. Its air is bracing and it is well adapted to valetudinarians suffering from nervous disturbance of the system. Its springs are of little note. Dr Lee describes them as differing very little in composition from spring waters.

Penzance. As a winter residence is highly spoken of; during the spring, however, from the prevalence of south westerly gales the

equability of its climate is disturbed and becomes decidedly objectionable to invalids. It is much exposed to the South-East, as it is, indeed, more or less, to all winds; nevertheless it affords many sheltered situations for out-door exercise. The atmosphere is very damp; the amount of rain which falls at Penzance exceeding even that of London. The following is the relative difference of temperature between Penzance and London during the different seasons according to Sir James Clark, "The mean annual temperature of Penzance is 51°·80 being only 1°·41 above that of London. But the temperature is very differently distributed over the year at the two places. Although Penzance is only a degree and a half warmer than London for the whole year, it is nearly 5° warmer in winter; 2° colder in Summer; scarcely 1° warmer in the Spring; and only about 2° warmer in the Autumn".

The deleterious effects of the excessive humidity of its atmosphere, in a great measure cancels the good effects of the small range of temperature of Penzance, and for this reason it is not generally recommended for consumptive invalids. It is, however, frequently advised in cases of bronchitis, dry asthma &c. The consumptive cases in which the soft, humid atmosphere of this place is likely to prove beneficial, are those in which the disease is accompanied with an irritable state of the mucous membrane of the lungs, with a dry cough, or one will little expectoration (Sir J. Clark).

"In a good many cases, however, of chronic bronchitis simulating

Phthisis, the health was greatly improved, and in some it was completely restored from a state of great debility and seeming danger. In a few cases, also, of young persons who accompanied their diseased relatives, and in whom the hereditary predisposition was strongly marked, if there was not already evidence of tubercle, - a great and striking improvement in the general health and strength followed within a short period after their arrival, and seemed fairly attributable to the combined influence of change of air, scene and habits."

Southampton. Could only be recommended to patients afflicted with inflammatory pulmonary disorders. From my own observation I should pronounce it a dangerous resort for most invalids, from its low, humid site and the effluvium of the mud at low water. The class of patients I have elsewhere advised to repair to live in the upper part of the town.

Scarborough. The "Queen of British watering-Places", as Dr Granville has termed it, is beautifully situated on the Yorkshire coast. It is one of the favourite resorts of Fashion in the Summer from the sea-bathing it offers, and its well known mineral springs. It is not, however, particularly adapted to invalids from any striking superiority of climate.

It possesses two springs; North and South, Chalybeate and Saline. Both, indeed, are chalybeate springs, but the North of which this quality more strongly than the South.

According to Philips the North well contains:-

Muriate of Soda	3.5 grains
Sulphate of Lime	18. —
Carbonate of Lime	6.5 —
Sulphate of Magnesia ..	18. —
Total amount of Solid matter	46 grains per pint.

and the South or "Saline" well,

Muriate of Soda	3.25
Sulphate of Lime	28.
Carbonate of Lime	6.
Sulphate of Magnesia	28.
Carbonate of Iron	.25
	65.50

The North well contains, in addition to the above, about a quarter of a grain of Carbonate of Iron in the pint. It is, therefore, slightly tonic; whilst the other is considered aperient: but, I apprehend the waters are more suited to that class of people who resort to the Sea-side annually; more as a general holiday, to shake off the dust of the city, and to purify themselves from the many ailments which are apt to make their appearance as the Summer progresses, rather than to the relief of actual disease. They have, however, a reputation for relieving "general relaxation and debility of the digestive organs: a vitiated state of the Secretions, torpidity of the liver, nervous disorders connected

with impaired digestion; as also scrofulous complaints".
Sidmouth. Fifteen miles from Exeter, on the Devonshire coast, offers much the same advantages to invalids as Torquay; but it possesses few resources for recreation or occupation. Jeffrey, a resident surgeon of Sidmouth, in his book on its climate, observes that "in all cases where disease or disorder is accompanied with a relaxed habit of body, softness of fibre, and paleness of skin - in chronic affections of the liver, chlorosis, anaemia, atonic dyspepsia, uterine disorder arising from debility - to these the coast cannot be said to be adapted during the summer months; in the autumn and winter they may be benefited. Those subject to peculiar nervous affections, who are very sensitive to cold, live here comfortably all the year round. Spasmodic asthma and irritability of the pulmonary mucous membrane are likely to receive benefit at all seasons from the soft moist air of the coast. For the young and delicate a residence here is desirable, and some forms of inflammatory rheumatism are benefited, as also cerebral excitation, but melancholy patients should not be sent."
Torquay. So deservedly one of the most popular watering places in England. It possesses great advantages in point of scenery, and from the excellent character of its climate is better adapted for invalids than almost any other seaside

resort. Sir James Clark speaks of it very eulogistically.
"The general character of the climate of the south-west coast is soft and humid. Torquay is certainly drier than the other places, and almost entirely free from fogs. This dry state of the atmosphere probably arises in part from the limestone rocks, which are confined to this neighbourhood, and partly from its position between two streams, the Dart and the Teign, by which the air appears to be in some degree attracted. Torquay is well sheltered from the north-west, and is in great measure protected from the north east winds, the great evil of our spring climate".
2d Chapter ("Climate of the South of Devon") observes:- Equability of temperature is one of striking characteristics. The winter season is the most damp, and autumn is not much superior. Summer and spring are comparatively dry seasons. In general language, it may be stated that from March to September the climate is dry and during the remainder of the year humid". It is commonly imagined that because Torquay is considerably above the average temperature in winter, that it must necessarily be disagreeably hot in the summer; and, indeed, as regards what may be called the old town, this is the case; but it is worthy of remark, that at a very slight elevation the temperature is not always only much warmer in winter but is likewise much cooler

during the Summers. Chr. Vivian, a few years since published a work on "The Climate of Torquay" which embodies many interesting particulars, and from which I borrow the following interesting Tables:-

"Average mortality of places

Torquay	1 in 61
Devon	1 in 53
South-western counties	1 in 52
South-Eastern counties	1 in 52
North-western counties	1 in 37
London	1 in 39
England and Wales	1 in 45
France	1 in 42
Prussia	1 in 38
Austria	1 in 33
Russia	1 in 28

Average number of days in which rain falls.

	Annual	Winter	Spring	Summer	Autumn
Torquay	132	35	30	32	35
Cove	131	37	29	30	35
Penzance	178	50	43	39	48
Undercliff	146	39	32	33	42
Clifton	169	45	36	41	45
Exeter	162	42	36	41	41

	Annual	Winter	Spring	Summer	Autumn
Hastings	162	39	31	33	49
London	153	48	43	44	43
Sidmouth	178	40	33	32	35
Rome	141	35	30	17	34
Madeira	70	23	18	6	22

From these (and other) tables we may learn the general characteristics of the climate of Torquay, its freedom from noxious influences, its mild, dry, genial air - its small comparative range of temperature, and its protection from prejudicial winds.

The extremes of temperature registered at Torquay, and the Horticultural Society's Gardens, Chiswick near London from Nov. 28th to Dec. 4th 1856, were as follows:-

Torquay	49°-29°	38°-29°	37°-28°	40°-27°	40°-29°	47°-42°	55°-48°
Chiswick	40°-19°	37°-16°	35°-14°	33°-15°	35°-19	37°-24	38°-30°

Torquay may be strongly recommended in Pulmonary disorders, bronchial affections, dyspepsia, scrofula, and general debility. Its capabilities for out-door exercise are very great.

Isle of Wight. This lovely spot, the garden-isle of England, is not only a source of pleasure and gratification to the tourist, from its charming scenery, but to the invalid blest and yet ephemeral climate.

Ryde, its principal town, opposite Portsmouth, is well-situated on a gentle hill sloping to the sea, surrounded by a wooded country, and sheltered from the south and south-east winds. Its soil is gravelly and quickly dries. Combes possesses superior advantages in point of sea-bathing. Freshwater at the south-western extremity of the island, enjoys a bracing air and is sheltered from the north-east winds. But the locality best adapted for invalids is the fashionable Undercliff first brought into notice by the well deserved encomiums of Sir James Clark.

The Undercliff is so called from its singular formation which is thus described, in an elaborate work on the Island recently published*. "The Undercliff consists of a series of terraces, formed by masses of chalk, sandstone, and rock, which have fallen headlong from the cliffs above, and deposited upon a stratum of blue marl. These cliffs form a lofty wall, extending some six or seven miles, and sheltering the plateau beneath from northerly and westerly winds. Generally, this wall attains an elevation of four hundred feet; at St: Boniface Down, it reaches eight hundred feet; at St: Catherine's Hill, nearly nine hundred. Even the lowest terraces, sheltered by this wall, are at an elevation above the sea-level of seventy, eighty or one hundred feet.

Imagine to yourself a magnificent esplanade, defended by a rampart of this tremendous height... a rampart often singularly bleak, and stern, but sometimes glittering with a chalky surface and rounded like a chalky down,.. an esplanade nearly a hundred feet above the level of the sea: the sun flinging his rays on the rocky wall, and the wall reflecting them on the slopes beneath: no trees, biting blasts crushing the life out of the young growth of nature; imagine, I say, a spot to be marked by natural advantages and now imagine the Undercliff.

Dr Clarke, a resident physician at Ventnor, has published a treatise devoted entirely to a medical review of the climate and resources of the Undercliff. According to this accurate observer the mean annual fall of rain in this favorite region is 35.15 inches, of which there falls 6.61 in winter, 4.44 in Spring, 5.67 in Summer, and 9.18 in autumn. The months in which there is most humidity are October and November; April is the driest. He observes that "The Undercliff presents a surprising ease over Madeira in mean daily range of temperature, in

certain months in the year; and which is of no small importance in regard to its reputation as a place of winter-resort during the season it is most desired". He observes that the advantages of this climate "in cases of glandular enlargements, diseased joints, scrofulous wounds, and lastly in incipient phthisis, are witnessed in each returning season". It is also adapted to chronic and nervous dyspepsia, to invalids returned from tropical climates, to children suffering from a relaxed and anæmic state of the system, and "to those of a scrofulous or tuberculous diathesis". The Undercliff, in fact, is suited to all invalids who require a mild, dry, winter climate. It should be avoided in the hot months, as the climate is then very relaxing.

At Sandrock, near the western extremity of the Undercliff, there is a mineral Spring occupying a lofty situation and commanding an extensive and engaging view. The water of this Spring is very powerful, a Joint containing not less than forty eight grains of Sulphate of iron, and in addition, about thirty grains of alum, with about twenty grains of aperient salts. Of course it

require to be drained before it can be used.
In comparing the climate of the Undercliff with that of Torquay, Sir James Clark remarks, "with a temperature nearly the same, the climate of Torquay is soft but rather humid and relaxing; while that of Undercliff is dry, somewhat sharp, and bracing. The winter temperature of these two places differs very little. Although at Torquay the temperature sometimes rises higher, it likewise sinks lower than at Undercliff, giving the latter the advantage in point of equability. The mildness and dryness of the climate during the winter months may be in some degree estimated by the circumstance of myrtles, geraniums, sweet scented verbena, and various tender and green-house plants usually withstanding the winter in the open flower borders".

Tunbridge Wells. This watering place is second only to Bath in its antiquity. "Its varied attractions of picturesque and truly wild scenery. The salubrious waters which perpetually flow from its iron substrata - and the bracing and finely scented airs which pass over its thymy commons and umbrageous woods, are so many secondaries to the valetudinarian and lover of Nature, that

the Many Days of the Wells, as Shakespeare sings of Cleopatra -

"Age cannot wither, nor custom stale
From her infinite variety."

Sir Charles Scudamore in his analysis of the water from that. "1. The water rises from a great depth.
2. The Specific gravity being little more than that of distilled water, the solid contents are very small.
3. It contains, iron combined with carbonic acid, by which it is held in solution, even at a temperature considerably higher than that of the human stomach... a gallon of the water contains about a grain of iron - and a pint bottle only an eighth of a grain - with about a cubic inch and a half of carbonic acid, and half an inch of azote. The strength of the waters varies with dry or wet seasons". ("English Spas").

Dr Yeates, a Physician residing at Tunbridge Wells, wrote an Article on the Tunbridge Waters, the following extract from which will serve to indicate the class of persons to which this locality is best adapted. "Observing, then, the stimulant nature of the air and waters of Tunbridge Wells, it is no difficult matter to ascertain what persons labouring under particular maladies, would be most benefited by a residence at this place, either permanently

or for the season. All that class of diseases which has general or local debility for its basis, finds a ready relief from the salutary stimulus of this renovating air. Some species of asthma, coughs arising from a pituitous state of the stomach, weaknesses and irregularities in young females, sick-headaches, irregular atonic gout; that degenerated state of the constitution, with a depression of spirits, produced by a sedentary life with mental exertion, so common to our city merchants, who neglect their health in a laborious search for the accumulation of wealth; and also the dyspeptic state of the literary student, panting for fame and distinction in his secluded study, will receive benefit at this place". And, indeed, it is probable that the air and general climate of the locality has more to do with renovating a debilitated system than the waters, which appears to occupy only a secondary consideration. Sir Charles Scudmore expressed his opinion to this effect many years ago. Though undoubtedly the spring belongs to the class of chalybeates, and may probably have a beneficial effect in cases where no active disease exists. They waters is said to be an unsafe remedy when the patient is of plethoric habit.

Whitby. Is picturesquely situated on the Yorkshire coast. The town is divided by the river Esk into two parts, both of which are situated on declivities on the opposite banks of the river. The houses on the West Cliff, new Whitby, as it may be called, afford excellent accommodation for invalids. It has a southern aspect, and is a good deal exposed so that the season for visitors is somewhat short; from June to October being the most genial months, and the Spring months the most objectionable. The atmosphere is pure and bracing, and particularly well-adapted to Scrofulous and other diseases requiring a tonic air. The sands are very good, hard and considerable extent, but a little too flat. The accommodation for bathing is ample and comfortable. The town is remarkable for its healthiness and the longevity of its inhabitants. I have been favoured with the following interesting table of the ages of those inhabiting the Seamens Hospital in Whitby. "Of 60 tenements now, or very recently, occupying these buildings, 10 were over 85 years of age; 6 were over 80; 5 were over 75; 11 were over 70; and 9, were over 60. One of the above died a short time ago aged 101 years; of the 10 described as being over 85 years, four died lately, and of the remaining six - 1 is now aged 88; another 87; and the other four are each 86 years of age".

The coast abounds in geological interest, and the whole neighbourhood is scenery of the most varied and picturesque character; few places can offer more extensive landscapes, on the one hand, and at the same time afford the most sheltered retreats, in which invalids may enjoy an abundance of out-door exercise. The valley, through which the Whitby branch of the North Eastern Railway passes, is allowed to be one of the most beautiful and most varied in point of scenery in the kingdom: at one time richly clad with sylvan garments, whence the smooth sward of the wood pigeon; and again, at another the hills are shorn of their wooded crests, affording shelter in the rugged crags for the Eagle and the Hawk. And again, at another part, the earths crust is stripped and its contents are exposed to the inquisitive eye of the geologist, even as the surface elsewhere attracted the curious eye of the botanist. There is a want of those amusements and recreations which render our fashionable watering places so attractive, and for this reason, mere pleasure seekers, do not pay long visits to Whitby. Invalids, however, will find it a most agreeable locality for a summer residence.

Worthing. In similar to Brighton in most of its

characteristics, and is adapted to a similar class of diseases.

Vale of Upton. Situated at a little distance from Torquay is highly spoken of by Sir James Clark as affording "one of the most eligible situations on this coast for establishing a Madeira village". He observes, that if accommodation were supplied along the base of the hills, and the neighbourhood was thoroughly drained, and rendered opportune for out-door exercise, "Upton would, I believe, form one of the best winter residences in Devonshire for invalids".

The End.