The Influence of Climate on Disease.

by

A.C. Tunstall, M.B.

1882.
The Influence of Climate on Disease occupies such an important position in the study of medicine in the present day that no apology is required for bringing it forward as a subject for a graduation thesis.

I propose to divide this paper into two parts:—First, The Effects of Climate in Producing or Predisposing to Disease and Second, in Curing or Relieving it.
I Producing & Predisposing Effects of Climate.

The ancients recognized the effects of climate in this relation. Hippocrates, quoted by Harland (Climate, Weather, & Disease; p. 13.) says: "Whoever desires properly to investigate the art of medicine, must do this: first, take into consideration the seasons of the year, and how each is capable of operating (on the system); for they not only do not resemble each other, but differ widely, the one from the other in the changes (they bring about). Then the cold and hot winds (must be noted), especially those that are common to all nations, and then those that are peculiar to any particular district. Hippocrates gives the results of his observations during four different years in the island of Thasos in the Aegean sea, noting the weather during each season. . .
the particular diseases which were most prevalent.

During the first of these years there seems to have been a Cold, Slighty Rainy Spring, a very Cloudy Dry Summer, a very Wet Autumn, & a Dry Winter; the Wind was generally Southerly except during the Winter when it was occasionally slightly from the North. In the Spring, there were some cases of Fever of a mild type "never fatal". In the Summer, Thieves of both an acute & a chronic form seems to have been prevalent, which in the Autumn went on to a fatal result. There seems also to have been some fever of the Remittent type but not fatal. In the Autumn & Winter an epidemic of Gyanche Parohidea prevailed in which the Parohid Glands were swollen so that eating & speaking were difficult: Hippocrates mentions the metastasis of this disease.
to other organs, particularly the testicle. He does not mention any
membranous complications for
the menon seem to have been
less affected than the uen.

The nest year under
observation seems to have been
quite different from the one already
cited for whilst in the first Degree
of the air & a southerly wind
prevailed; in the second moisture
frequent rains & northerly winds
were most common. In the
Spring, Aphthaeemia was frequent.
In the Summer, Dysenteric affections
characterized by Tenesmus, Diarrhoea
with thin copious & indigested evacuations & going
on in the Autumn to Strangury;
Diarrhoea vomiting. There were also
Sore of various sorts & frequently
fatal. Convolutions, Small pustules
swelling about the feet (which
however did not suppurate), & in
other cases abscesses supervened.

Apparates describes the Aphthaeemia
as occurring epidemically in places exposed to cold winds & sheltered from the warm winds. This affection was often so severe that it ended in rupture of the eye. The Dysentery seems to have been most common in Summer, next in Autumn rarely in Spring & least of all in Winter. The Influenza were attended with coughs which would give rise to cutaneous diseases (which were particularly fatal among children) somewhat the character of measles, although the swelling about the ears & elsewhere, connected with the great mortality, seem to point to scarlet fever.

The next year was also characterized by Northerly winds, though by an absence of rains & by great droughts. We still find disorders of the bowels & fevers common; we have in addition
Apoplexy, hemorrhages, difficulties in parturition & abortions. After mentioning that the apoplexy occurred during the cold dryness winter, Hippocrates goes on to speak of the critical hemorrhages which were so common in cases of fever during this year that there seems to have been a "general hemorrhagic tendency." It also showed itself in connection with other diseases. It is very interesting to find that Hippocrates believed in the great influence that weather has over pregnant women. He says, "If the winter be southerly, showery, mild, & the spring northly, dry, & wintry, these women who expect to be confined during the spring are apt to have premature labours." (p 63-)

The fourth & last year that shall mention seems to have been the worst of all, & so bad was it that Hippocrates calls it the "Pestilential" year.
The diseases which prevailed were:
Erysipelas in various forms, Typhus
remittent & intermitent, Phthisis,
Croupitis & Thrush, Rubies, Boils &
Soreness, Dysentery & other diseases
of the Bowels, Lungs & Kidneys; -
all of an atheletic character. The
Spring was most fatal & the Summer
least so: in the Autumn quartan
ferrns carried off a great number
of people. I will finish with
Sneedrates by quoting his
discipline of Glaucous Ery-
rysipelas which seems to have
been the kind which prevailed
epidemically. He says (p. 112)
In the beginning of the Spring,
coincident with the presence of
the cold weather, there were many
cases of erysipelas: Some had, while
others had not, an (apparent) cause;
they were of a malignant charac-
ter & killed many. * * * erysipelas
attacked many persons on slight
occasions, & on account of the
commonest & most trivial wound,
indiscriminately all over the body, especially of patients about 60 years of age; (it also attacked) the head, if the slightest wounds were neglected, even in many cases whilst under treatment, severe inflammation took place, and extensive erysipelas quickly spread everywhere. In most of the cases the swelling suppurred (followed by) great discharges of flesh, tendons, & bones. The discharge that attended these sloughings was not like matter (pus), but was another kind of putrid humour; it was both plentiful & variable. In those cases where it attacked the head, the whole of the hair fell off from both the scalp & the skull; the bones were exposed & exfoliated, & there was profuse discharge, & this both with & without fever. These things were more dreadful than dangerous, for whenever suppuration was properly brought about, the majority were saved; on the other hand, where
The inflammation & erysipelas supervened, but produced no such abscess, many of the patients were destroyed. The same course was run by this disease in whatever other part of the body it might wander. x x x Many suffered from (this epidemic) during fevers, before fevers, & after fevers. But in such cases, if the abscesses suppurated, or a favourable evacuation of the bowels, or a discharge of well-conditioned urine, supervene, convalescence takes place; but if, on the contrary, none of these things happen, & the (erysipelas) disappear without a token, the cases terminate fatally. Erysipelas was most prevalent during the Spring, but it continued through the Summer until the Autumn.

In connection with the above quotation on "The Meteorological Conditions conducive to Erysipelas", Mr. Gamiland remarks:—(p 119.) From the fact that erysipelas
is a disease which is most fatal during the cold seasons, we may suppose that a reduction of temperature, and the other attributes of winter and spring, are conducive to its development; and such, in fact, is the case, for we find that exposure to cold and moisture is one of the most frequent atmospheric causes. The year in which the purulent form took place is described by Hippocrates as being excessively damp, and the season that preceded the one in which this complaint began to rage was very winterly; the air was also calm and stagnant, and thus became loaded with emanations from those who had already been attacked. The year 1838 was remarkable for its coldness and humidity, and its excess of deaths from erysipelas. The year 1848, in the winter
quarter of which the number of deaths in the metropolis rose to
195, nearly double the amount of the average, was 

distinctly distinguished by a large fall of rain, which coincides exactly with the above observations. "The winter quarter of 1853, was remarkable for the excess of deaths from erysipelas, and we must attribute it to the very low temperature that characterized the three first months of the year. The year 1848 must be considered a pestilential year, for in many parts of England the cholera had begun to show itself. Of erysipelas there died 3616, of cholera 1908, of diarrhoea 11069."

Coming nearer our own times,—Prof. Hecker in his "Epidemics of the Middle Ages" (p. 12) says among other causes for the spread of the "Black Death" in 1348, "a thick clinging mist which advanced from the East
spread itself over Italy, which was at that period more affected by earthquakes than ever before. The earthquakes gave rise to innumerable chasms which emitted noisome vapours which poisoned the neighbouring atmosphere. Numerous floods added to the general disaster & confusion, by converting the low-lying lands (especially near rivers) into marshes from which arose pestilential fumes whose bad qualities were intensified by the stench from dead human bodies to which lay wastes. As a consequence of the disturbance of the seasons & the prevalence of rain & floods, failure of the crops & famine were almost universal.

The same author in speaking of the "Shaking of Sicily" of 1483 says (p. 187) that it did not extend beyond the limits
of England, (Scotland & Ireland remained unaffected). This
bad prominence of England seems to have been due to
the humidity of its climate especially to some peculiar
atmospheric changes. The chronicles have noted the
remarkable dampness of that
year. Though humidity had
something to do with the
presence of this disease, it
cannot have been the sole
cause, for heavy rain storms
are said to have been
common throughout the
Continent also.

Leaving the writers
of antiquity & dealing with
the subject as it presents
itself in the present day,
the various diseases arrange
themselves most conveniently
according to the different
systems of the body.
General Diseases.

Fevers.
The exciting causes of intermittent fever according to Dr. Horton, ("Diseases of Tropical Climates" p. 18), consist in the exhalation of a certain invisible effluvium from decayed vegetable as well as animal matters. Known as Malaria, its presence is detected solely by its effects on the constitution. There are two hypotheses laid down to account for the origin of malaria. First, that it is the production of vegetable & animal decomposition; secondly, that it is an exhalation from the earth, favoured by the state of marsh. For its production, malaria requires moisture & a certain amount of heat for the decomposition of the vegetable matter and the
disengagement of the miasma. By the moisture then, putrefaction is accelerated & malaria results. Anything therefore that puts a stop to putrefaction such as dry weather in a moderate swamp or extreme wet (so as to produce flooding) stays the disease. In tropical countries therefore, when there has been much rain in the rainy season the weather is comparatively healthy, because the rivers & canals are plentifully supplied with water, which flows on rapidly, & all the marshes are inundated & thus prevented for the time from giving rise to noxious exhalations. But at the beginning & termination of the rains the quantity of wet being small & quickly evaporated by the sun, the ground is hot & moist & fever is much more frequent.
malignant than at any other period. During the very dry weather again, fever is less frequent because the vegetable matter either out, or in, the soil, becomes too dry for putrefaction, and the consequent formation of marsh miasmata. Fever is seldom traceable beyond 50° of north latitude, for it requires a continuous temperature beyond 60° F. for its production. Consequently, as we approach the equator it becomes more abundant, virulent, and pernicious. For this reason malarious diseases are more severe in tropical, than in temperate climates. This is particularly the case in autumn, because at that season there is far more vegetable matter to decompose than at any other period of the year. The lagoons of India, China, Japan, and the Guinea Coast of Western Africa
are during certain periods of the year the source of most deadly malarious emanations which are produced in a very concentrated form. Stagnant water through the decomposition & putrefaction of the organic matter which it contains produces germs; therefore any quantity of water however small lying stagnant containing decaying vegetable & animal matter is sufficient more or less to cause intermittent fever. In many places which have only a small pond or muddy pool such as is frequently seen near houses in tropical countries, quinine diseases are produced. Another cause of afever is the clearing of the land by planters in preparation for sowing & thus depriving the country of this means of absorption of the malarious effluvia from
Damp and stagnant pools of water at the same time produce more dead vegetation ready to decompose. The great want of electric agencies in the atmosphere is also said to be one cause, on account of the diminution of the quantity of ozone produced & the consequent incomplete oxidation which takes place. Certain kinds of soil are peculiarly favourable for the development of malaria, such as clayey soils owing to their power of retaining moisture for a considerable time. whereas gravelly soils are the least favourable on account of letting the moisture through. Malaria seems to be more potent during the night than in the day on account of the greater condensation of the air from its being at a lower temperature & holding the poison in a
more concentrated form.

Dr. Horton gives 8 laws in connection with Széchenyi. - (P. 26)

1. That the lower strata of the air are generally the most dan-
gersous, either from the specific gravity of the pestiferous ex-
thalation, or from its union with moisture, or from some
peculiar (at present) inexplicable attraction towards the earth.

2. That Széchenyi may extend from its source by being driven
by the wind, in which respect it is analogous to heavy fog.

3. That the cultivation of the soil, & the consequent drainages
of swampy lands, causes the diminution of Széchenyi in a
country.

4. That marshy poison has also been observed to be attracted
by, & to adhere to, the foliage of many umbraeous trees,
which makes it dangerous to sleep under them.
5th. That it loses its properties by passing over a large surface of water.
6th. Malaria may be drifted up by the wind on the sides of ravines to a great height; according to Dr. Parkes, as far as 500 ft.; Dr. Maclean thinks it from 1000 to 2000 ft.; this will account for Malarious fever occurring at such a height when there are no immediate local causes.

The Climatic Producing and Pre-disposing causes of Remittent and Yellow Fever so nearly correspond to those already cited, with or without some specific poison superadded, that I will not dwell long on them but will finish this section by quoting Dr. Mc. Ferguson's account of a small district on the island of St. Domingo where
all the above mentioned diseases were found to be distinctly localized according to the sanitary conditions and elevation of each particular part. He says:—(Horton p. 314)

"Our head-quarters were in the town & its adjacent Brigton, as pestiferous as any in the world. Here we had constant yellow fever in all its fury. At the distance of a mile or two on the ascent up the country stood our first post. Dorpian, where the yellow fever appeared to break off into a milder type of Remittent. Higher up was the Post of Grenier, where concentrated Remittent was rare, & milder Intermittent with Dysentery prevailed; & higher still was Fourmies, where Remittent Fever was unknown, Intermittent uncommon, but phlegmatacous ulcers so frequent as to constitute a most
formidable type of disease; and higher still were the mountains above C'rikahaye, of greater elevation than any of them; far off, but within sight, low down, in what was called the height of Leopolis, where a British detachment had always enjoyed absolute European health — indeed, it might be called better — because the climate was more agreeable than in higher latitudes. Here were the separate regions or zones of intertropical health mapped out to our view as distinctly as if they had been done by the draughtsman. Taking Port-au-Prince for the point of departure, we could pass from one station to the other, and with a thermometer might have accurately noted the locale of disease according to the descending scale, without asking a question among...
the troops who held the posts. It was just as impossible, or more so, to carry a Yellow Fever up the hill to a post in sight, as it would have been to escape had they been brought down located amidst the swamps of Port-au-Prince.

Shane already noticed the pretty fully the Meteorological causes of Chydisipelas (pp. 10-12) a slightly shore of the Plague (pp. 13-13) so will not take up more time with them now

Goitre & Cretinism.

Goitre is endemic in certain districts where hard unwholesome water is used for drinking; it exists chiefly in limestone districts. Thus, Dr. McClelland examined 126 villages on or close to limestone rocks at the
post of the Himalayas with the following results (Horton 59) 1.

Five of these villages were built upon hornblende & mica
slates, or on silicious sandstone, or on green sandstone. They
contained 290 inhabitants, not one of whom was a cretin,
or was affected with Goitre.

2. Twenty-one of the villages in the same district were built
upon clay - slate. These contained 3,957 inhabitants, of whom
there were 22 persons with Goitre, or one in 200 of the population.
There was not a single cretin.

3. Thirty-five villages, having a population of 1,150, were built
upon Alpine Limestone, in them 390 persons, or more than
one-third of the inhabitants, had Goitre, while 34 of them were
cretins, or about one person in every 35.

These results seem to derive confirmation from
The fact that the Gâbren district of England are Derbyshire & Norfolk which are largely of limestone formation. In Europe Cretaceous generally occurs on the shady sides of those Alpine valleys which from their depth above set the full force of the sun's rays. A recent writer in the "But Med. Journal" (Dr. Bruce Low, Jan 14 & 21, 82) after carefully reviewing all the probable causes of Gâbre, comes to the conclusion that potable water has more to do with its production than any other cause. He even cites cases of French conscripts, who, in order to avoid the hated military service, flock to the well-known potable springs in the Briançon & other districts. 

At three weeks' course of these waters will enlarge their thyroids: it, anticipating their rejection, as the goitrons are exempt, they
present themselves before the
medical board.

Rheumatism.
The principal causes of Rheuma-
tism, besides the Rheumatic
diathesis & hereditary predis-
position, are exposure to cold
& wet or damp in different
various ways, particularly
when the body is heated and
perspiring freely.

Diseases of
The Digestive System

Diarrhoea
"Change of weather" according to
Dr. Horton (p. 392) is one of
the most frequent causes of Diarrhoea
independently of any other civ-
circumstances. In the East & West Indies, the approach of the cold weather always leads to the development of congestive hepatic disorder, with diarrhea & dysentery; in Africa, in regions where the harmattan cold, dry wind blows with force during its season, we find that it checkers the intestines perspiration, congests the liver, & in new corners, leads to increased action of the intestines, resulting most generally in simple diarrhea, but not dysentery. One who resides in a plain country, where the thermometer is generally high by proceeding to a mountainous country, where the thermometer is very low, suffers from the change just as if he had been proceeding from a very hot to a very cold climate; & this is proved by those in the East Indies, who proceed from the lower countries to the
Himalayas. Those who have visited Simla, writes Lt. R. Marley, and some of the stations on the
hill ranges of the Himalayas, have very generally observed a change to a pale colourless state of the intestinal secretions
soon after the ascent into these regions; resulting, it is presumed, from the comparative cold &
damp of the mountain air. Diarrhoea is, in fact, a frequent result of this change of climate,
especially of exposure during night & early morning & the sudden application of cold & damp to the surface of the body previously relaxed by the heat of the plains.

**Dysentery**

The change from cold to very hot weather is known by tropical physicians to be the sole cause of Dysentery in
many constitutions, especially
Europeans of short residence in tropical climates." (Horton p. 242) Dr. Massy states that "The principal exciting cause of dysentery is connected with variations in temperature, which by checking the perspiration, induce vitiated secretion & internal constictions. These influences are chiefly felt in the Bengal Presidency during the hot winds, especially in the rainy season of September & October. During the prevalence of these hot winds, soldiers wear little clothing, constantly discarding flannel, shelves, etc., & while in a profuse perspiration they lie down in a draught, the wind even though it may be hot, acts coldly upon the wet calico clothing, & bowels complaints or fever results." Dr. Horton to whom I am indebted for the above reference, himself well explains
The modus operandi of cold exposure in the production of this disease, — he says (p. 243) —

There are various ways by which dysentery might thus be produced

(a) Night guards amongst soldiers and sailors. Soldiers on guard at night in tropical climates suffer seriously from changes in the weather, especially those serving in the interior of hot countries, where the variation of the temperature between day and night is very great; the land around swampy, vegetation luxuriant, the night air damp and very fogy.

During the day the excessive action of the sudorific glands, as well as the skin, caused by the intense heat of the sun, produces a great deal of perspiration, and sometimes leads to a plentiful supply of biliary secretions, which the cold damp night air suddenly
checks; & thus a determination of blood to the mucous membrane of the intestinal coat is induced.

(3) I have met with persons, subjects of Chronic Dysentery, who suffered from a severe relapse by opening of the windows of their chamber at night, & allowing the cold air to fall directly on their body.

(4) Want of sufficient clothing according to Witherell, sudden exposure to cold after great heat is merely a casual occasionalis of Dysentery, & does not of itself bring on Dysentery, but may aid the action of the more potent causes. But Dr. Ferguson says, "True Dysentery is the offpring of heat & moisture—of moist cold in any shape after excessive heat. Nothing that a man can put into him would ever give him true Dysentery."
Cholera.

It seems to be well established that the ravages of Cholera are intensified by a warmish temperature, a moderately moist, & peculiarly heavy condition of the atmosphere, & an absence of wind & of ozone. Indeed scarcely mention the well-known preference of Cholera for low damp districts, especially those about the mouths of rivers & other ill-drained localities.

Diseases of The Respiratory System.

The Respiratory System perhaps more than any other is peculiarly liable to be affected by Climate simply (i.e. without
The addition of other causes, as asthma, consumption, &c., particularly its changes in temperature, moisture, & barometric pressure.

The great mortality from diseases of this system in England makes the subject especially interesting to us. According to J. V. Fane's table of 'Death Causes' for 4 years (1860-3) (Index of Diseases p. 66) out of an average yearly population of over 20 millions, the average yearly mortality from all causes was over 442 thousand.

Of these 122,000 died from diseases of the respiratory system, 62,000 from diseases of the Nervous System, 25,000 from Digestive System, 18,000 from Circulatory System, 5,000 from Urinary System, 1,000 each from diseases of (Note: A. B. C. These 3 groups include Tubercular Phthisis & Meningitis, & Tylus Mesenterica.)
The Reproductive, Locomotory, & Integumentary Systems.

In other words, diseases of the Respiratory System were the cause of more than 4 of the whole mortality in this country & were nearly twice as fatal as those of the Nervous System. Times as those of the Digestive System, 5 times as those of the Circulatory, 24 Urinary, 120 Reproductive, Locomotory & Integumentary Systems.

The Climatic causes of Bronchitis, Pneumonia, & Pleurisy are all so familiar that I will not take up space with them, but will just refer to Asthma before I go on to Phthisis.

Asthma.

There is something subtle mys.
serious & at present, unexplainable in reference to the effects of climate on the paroxysms of this distressing malady; thus a patient who is unable to sleep in the pure air of Malvern or other salubrious health-resort, may enjoy undisturbed repose in the smoky atmosphere of the centre of London. Soon after I became a student a farm servant was admitted into the Chelsea Royal Infirmary because he was unable to sleep in his own home in the country owing to the severity of his asthmatic attacks, and he experienced complete immunity from the spasms as long as he remained in the not over pure atmosphere of the ward (of the old Infirmary).

Phthisis.
In reference to this wise
Spread of fatal disease, I cannot do better than quote the able remarks of Dr. C. F. Williams in his Sethonian Lectures on the Influence of Climate in Pulmonary Consumption. He says (p. 14) "It is an undoubted fact that, however much consumption disease we may assign to the causation of bad food, defective ventilation, injurious occupations, heredity & the like, for a very large number of cases, climate & soil are answerable; & this is more certain, because the disease is found in various parts of the world, irrespective of habits & races. This is originates in all latitudes, from the equator — where, with slight variations, the mean temperature is 80° F. to the temperate zone, where it averages about 40° F., with
great & sudden, variations. It prevails in cold & humid climates, & also in hot ones, though a remarkable difference shows itself in the forms prevalent in temperate & in tropical countries. In the former it is extensively associated with catarrhal & inflammatory attacks, & as a rule, runs a chronic course; in the latter it is marked by febrile symptoms & a very acute course, having much the character of rapid & general blood-poisoning, attacking other organs besides the lungs, lasting only a few months, or sometimes only weeks. This form & prevails in the littoral of Peru, in the West India Islands, & in the Society & Marquesas Islands, where it causes great ravages. It carries off one-third of the population at Tahiti, prevailing more among the women.
than the men, which is exactly the reverse of what obtains in this country. Whole families become a prey to convulsive cough. In a few weeks the Tahitians pass from a most flourishing state of health into most complete wasting. This seems to be a good case of climate causing the disease, as some of the sailors of the French private 'Sirene' were attacked with this severe form of consumption while in port at Tahiti. In a crew of 680, twelve died, and a large number had their lungs affected. We may fairly conclude, therefore, that certain forms of climate are direct causes of consumption.

Diseases of
The Nervous System
Insolatio.

The chief climatic causes of this complaint are:—

Extreme & long continued heat with only slight variation between the day & night temperature; a rarefied & highly electrical state of the atmosphere; and bad ventilation. Many cases occur when soldiers are marching in a state of exhaustion through districts polluted by foul exhalations. I hear from a retired Indian Army surgeon that in his experience most of the cases of sun-stroke occurred in the morning & in the evening when the men were exposed to the horizontal rays of the sun.

Apoplexy.
Apoplexy in the tropics is often attributable to the same climatic causes as insolation.

Diseases of the Integumentary System

Elephantiasis Arabicum

The frequency of this disease is attributed by Dr. Bonnet of Rio Janeiro (Acta Ann. p. 637) to the heat and moisture of the climate and to the unhealthy exhalations contaminating the air. In Western Africa it also follows from the irritation produced by the Guinea Worm. The composition of the soil and of the water used by the inhabitants is also supposed to have some effect in producing the disease.
Eye Diseases

Purulent Ophthalmia

Among the principal causes of Purulent Ophthalmia in adults are, a close damp atmosphere loaded with animal exhalations, overcrowding, & a neglect of cleanliness & proper ventilation. In Egypt it is endemic owing to the glaring sunshine & the irritation caused by the particles of dust with which the air is loaded. (Smith Surgery, p 369)
II Curing & Relieving Effects of Climate.

With the foregoing facts in view it is evident that to what a great extent the bad effects of climate may be modified by a careful attention to the carrying out of sanitary laws.

Take fevers for example, when marshes & stagnant pools have been drained & sources of animal & vegetable putrefaction removed, intermittent & remittent fevers become extinct.

Many years ago (Jan. informed) the site of the Princes Street Gardens & the Waverley Railway Station line was occupied by a large, shallow, more or less, stagnant sheet of water, at that time Fungus was common in that part of Edinburgh, now I suppose
an endemic case is very seldom seen. A curious instance of the disappearance & reappearance of plague is mentioned by Dr. Williams in his Lettowan Lectures (1848) which is also interesting in connection with this. "On a marsh near Rutland, the being drained, endemic intermittent fever disappeared, a phthisis, hitherto unknown, then became common. At the request of the inhabitants the old order of things was restored to & the marsh re-established, when fever reasserted her sway. The banishment of consumption. Even the more serious disease, Typhoid & Yellow Fever & Cholera, disappeared at a rate bearing a proportion to the care taken to carry out strict
general and personal hygiene measures.

Again as regards Diarrhoea & Dysentery, the avoidance of exposure to cold, wet, and night after a hot fatiguing day very much reduces the chance of a severe attack.

As the Respiratory System was the one most affected by Climatic Pre-disposing causes, proper, so also, its diseases are among those most relieved by a judicious change of climate. In fact certain districts seem to possess an almost complete immunity from some of the principal diseases of this system.

I will conclude this paper by referring to some of the facts in connection with
The Climatic treatment of Pthisis.

Pthisis.

There are 3 different theories advanced by various authors, according to Dr. Williams, (Influence of Climate in Pulmonary Consumption," p. 78 seq.) to account for the immunity from Pthisis possessed by different climates. 1st. That of High Altitude.

2nd. Of great Cold.


Many distinguished Physicians consider that a high altitude above the sea-level gives immunity from Pthisis. There are many interesting facts which give support to this hypothesis. Thus at Lamyberg, which is near the sea level
The Pithius mortality was 25% of the whole death-rate in 1853. (Neuh.) & was more than twice as great (10%) as at Eschwege, which is 496 ft. above the sea level; while at Bollersde in Thuringia, 1840 ft. high, it fell as low as 3/4%. Virchow asserts that Pithius is very rare in the Spessart, 1400 ft. high, & Dr. Lombard of Geneva never knew an instance of the disease among the monks of St. Bernard. Dr. Berry & Brügger state, that Pithius is unknown at an elevation above 5000 ft., except in persons who have contracted the disease in localities situated at a lower level.

Here is one important consideration which must not be neglected in connexion with this subject.
mane, the dense population of the places at a low level, as compared with the conditions of the inhabitants of these mountainous regions. It is well known how strongly bad air, poor food, over-crowding & intemperance, tend to induce consumption; hence it is not surprising to find that if the hardy dwellers in a region 5,000 or 6,000 ft. high descend to the towns of Europe in search of wealth, they may become victims of phthisis. -- Though this objection seems to hold good as regards Europe, the altitude theory becomes more weighty when we take South America into consideration; in that continent large towns are found at a height of 12,000 ft., & still phthisis, though rife at the lower levels, near the sea, is said never to originate above
6,000 ft. Though all the other conditions favourable to its development, inseparable from town-life, such as over-crowding indoor-pursuits, & other insanitary conditions, are found, from which the scattered villages & chalets of the mountainous parts of Europe are generally exempt. Some physicians account for this immunity by the improvement of the constitution from the increase of the appetite & digestive powers; others, Dr. Walsh among them (see p. 12. Dr. Williams' Lectures) consider that the inhalation of rarefied air increases the capacity of the lungs & chest; Fourdinet found the chests of the Mexican Indians unusually large & wide, & quite out of proportion to the rest of the body: Dr. Williams(p. 14) gives the following as being the
chief features which appear to be common to all moun-
tain climates compared with low-lying districts:—the lower barometrical pressure, & in winter, the greater dryness, from the comparative absence of vegetation, as well as the increased power of the sun's rays from the greater clearness of the atmosphere.

Second theory. Great Cold. This is supposed by some to produce immunity from phthisis & that the farther north we go the smaller phthisis mortality we find. The origin of this theory seems to be due to the rarity of the disease in the extreme north as Finnmark, the Faroe Islands, & Northern Scandinavia. But a more careful examination of Shetland, Iceland, & Greenland seems to prove that cases of phthisis are not so uncommon as was formerly supposed.
Third Theory: The
Prevalence of Ague.

Shane already referred (p. 44) to
cases of phthisis appearing for the
first time, on the disappearance
of ague following the drainage
of a marsh, & then (i.e., the phthisic
cases) disappearance again on the
marsh being re-established.

Dr. Green & Dr. Drake mention
the same thing as occurring
in the United States, & Prof.
Schrödelin in connection with
the boggy tracts between the
lakes of Zurich, Wallenstadt,
& many other physicians give
like testimony. The immunity
seems to be greater in the
centre than at the confines
of a marshy district, & those
leaving the district appear to
lose their immunity, while
cases of "phthisis when once
established," seem to have
the disease retarded by removal
to a marshy district.
Dr. Williams' experience was not quite so favourable, as he had several hopeful cases of arrested phthisis, rekindled by attacks of intermittent fever inducing pulmonary congestion & hastening on lung-disorganisation & a fatal issue. (p. 19.)

I will conclude this paper by referring to the climatic treatment of phthisis when the disease is once established & commencing with our own country, going on with the Continent of Europe & North Africa & the Voyages. I will finish with North & South America & England.

The principal health-resorts, particular as wintering places, for phthisical patients in this country, are situated on, or near the south coast. Of these I shall take 14 as typical examples. [12]
4th. Lyndhurst.
1st. Hastings, is built on sand of sufficient depth to make the soil dry; it is protected on the north & north-east by high cliffs, but is exposed to a certain amount of the east winds. The mean winter temperature is 39° F., with a range of 33° F. Rain falls on 39 days in winter to the amount of 7.59 in. (J. William F.)
2nd. Ventnor, is built on a series of steps facing the sea, formed of green sand & chalk, it is open to the south, south-east, & south-west, it is sheltered on the north, north-east, & north-west, by lofty downs. Its mean winter temp. is 41° F., with a range of 39° F. Rain fell on 39 days in winter to
the depth of 4.65 in.

3. Bournemouth, is situated on land of very considerable depth, & is sheltered on the north, & east, by a forest of fir-trees, & hills in the distance, but very open to the sea on the south. The mean winter temp. is 42.3° & the annual rainfall 28.7 in. 4. Torquay, stands on shale & limstone, in a corner of Torbay, where it is completely protected from the north, east, & west, winds by Dartmoor, & intervening hills. The mean winter temp., which is the highest in England (according to W. Vivian's tables), is 44°F with a range of 29°. The mean rainfall is 68.2 in. extending over 35 days.

J. Williams (see Influence of Climate in Pulmonary Consumption, p. 40 et seq.) sent 233 phthisical
patients with the following results,

<table>
<thead>
<tr>
<th>Place</th>
<th>Improved &amp; Died</th>
<th>Remained stationary</th>
<th>Became Worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hastings</td>
<td>72 p.e.</td>
<td>5 p.e.</td>
<td>23 p.e.</td>
</tr>
<tr>
<td>Veniuv</td>
<td>69</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>Bourmiit</td>
<td>15</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Longway</td>
<td>60</td>
<td>10</td>
<td>30</td>
</tr>
</tbody>
</table>

These figures are exceedingly interesting, for the largest amount of benefit was received at the coldest and most easterly of the 4 different stations, instead of at the warmest, as might have been expected; they seem to indicate that a bracing air is more conducive to recovery from phthisis than a very mild, relaxing climate, that, instead of seeking for a sedative atmosphere to allay the cough and reduce irritability, we should in most cases select a stimulating one to increase the appetite & to
Innovate the System.

Foreign Climates.

For the sake of convenience I
will arrange the foreign climates
into 6 groups, partly adopting
Dr. Williams' classification, viz.
1. Celsius, inland, temperate.
   European climates, with some
2. Dry Marine climates of
   the Mediterranean Basin. E.g.
   The Riviera, Malta, & Algiers.
4. Moist & warm Atlantic
   climates. E.g. Madeira & West Indies.
5. Sea Voyages.
6. High Altitudes, &c.

The following table is the
result of the treatment of 335
physical patients at these
different climates by the recom-
menodation of Dr. Williams.
I have taken the figure from
his account of each particular
place where they differ slightly
from the table of on pp. 74-5.
(Will refer to high altitude)

<table>
<thead>
<tr>
<th>Climate</th>
<th>Temp.</th>
<th>Rel.</th>
<th>Stationary</th>
<th>Worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calm, inland, temp., moist, European</td>
<td>60° p.e.</td>
<td>5° p.e.</td>
<td>45° p.e.</td>
<td></td>
</tr>
<tr>
<td>Marine, dry, Mediterranean</td>
<td>62° 3</td>
<td>20° 4</td>
<td>19° 1</td>
<td></td>
</tr>
<tr>
<td>Very dry, Egypt, etc.</td>
<td>65</td>
<td>25</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Moist, warm, Atlantic</td>
<td>53° 8</td>
<td>14° 2</td>
<td>34° 29</td>
<td></td>
</tr>
<tr>
<td>Sea Voyages</td>
<td>89</td>
<td>5° 5</td>
<td>8° 5</td>
<td></td>
</tr>
</tbody>
</table>

The 1st group (taking Pan as an example) seems to have the smallest number of stationary cases & the largest number of worse. The principal disadvantages of the climate of Pan are: the large number of rainy days, the great rainfall, & the low mean winter temperature. Its chief recommendation for phthisical patients, is the great stillness
of the atmosphere which is particularly agreeable in spring when other health resorts are too hot or windy.

Most of the places in the 2nd group (taking the Riviera for an example) have the advantage of a southern aspect, of being sheltered from the northerly winds, & of having a warmer mean winter temp. (47°-49° F.) than many of the adjacent parts of Italy. The climate is dry, the rainfall being about 25 in. & the number of rainy days 45 to 80. There is "abundant sunshine throughout the winter." The real advantage of the Riviera climate is the combination of the bracing element with dryness, sunshine & moderate warmth, while these are necessary to maintain the appetite as well as to soothe the cough & other local symptoms. Mentone & San Remo are most sheltered from the north winds, whilst Cannes & parts of Nice,
are more bracing. Algiers has a warmer and moister climate than the Riviera, its mean winter temp. being 55° F., its rainfall 32 in., & the number of rainy days 89. J. Williams mentions the case of a young lady (p. 93) with strong phthisical predisposition, a pulmonary cavity of considerable size, & great emaciation, who, after passing three months in Algiers lost her cough, became stout & well, & on the examination of the lung, no trace of a cavity could be detected.

Taking Egypt as an example of the 3rd group, we find that its figures are rather higher than the average of most very dry climates viz. 65° P.C. improved 25° P.C. Relative + 10° P.C. became worse. The mean winter temp. is 58° 52° F., the rainfall is very small, the number of rainy days seldom more than 15 in the year. The greatest advantage seems to be
derived from taking a voyage of 800 miles or so, up the Nile in one of the large well appointed river boats. In this way the patient is spared all fatigue, & supplied with the pure dry air of the Desert, his mind being perpetually occupied by a succession of objects of interest, offered by the glorious monuments of the past, by the picturesque & remarkable studies of present life in Egypt as the boat stops frequently to allow proper exercise & rambles on shore. (Dr. Williams p. 96.)

The 4th Tour includes the warm, moist, Atlantic climates; the principal one being Madeira. This place was formerly in very great favour as a winter residence for phthisical patients on account of its mild sedative climate. Its mean winter temp. being 60°6 F. with a rainfall of 20 in. in 88 days, forming a warm moist atmosphere which is particularly soothing to
coughs. Recent observations however have shown that Madeira is not so suited for phthisical invalids as was once supposed; of 20 cases sent there by the Brompton Hospital, only 3 derived benefit. 1 died there, & the rest returned home worse than they went; in 100 cases given by Dr. Land (Dr. Williams' 1842) there were 47 in which the disease was said to be arrested, whereas in 27 cases mentioned by Dr. Renton, "32 died in 6 months after arrival, & the rest shortly afterwards." The figures given in the table refer to 53 patients sent by Dr. Williams to Madeira & they are the second worst on his list. He considers the catarrhal form of the disease the one for which Madeira is best suited. The hill country of Jamaica enjoys a high reputation among the Americans for the treatment of phthisis, & Dr. Williams mentions..."
(p. 94) The case of a young Cornish medical man who consulted him with all the early symptoms of phthisis well marked as well as a distinct family predisposition. He went to the Blue Mountains, Jamaica where he lived for some time at an elevation of 4,000 ft. In 3 mos. he lost his cough & was able to undertake a very active life as medical officer of a large district which involved riding 13 hours daily. On his return to England some time afterwards, there was no trace to be found of his former disease. He appeared the picture of health & had gained several pounds in weight.

The 3rd Group, Tea Voyages show the best results of any on Dr. Williams' table. The voyage to Australia & New Zealand is the one most recommended, (p. 99) the best time to start being
October or November, a sailing vessel takes about 3 months for the passage, a month or two can be spent on shore, returning to England in the summer. The temperature during the voyage is about as follows:

<table>
<thead>
<tr>
<th>Location</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaving England at the beginning of October</td>
<td>62° E 58°</td>
</tr>
<tr>
<td>Off the Azores</td>
<td>60°</td>
</tr>
<tr>
<td>On passing the Canaries</td>
<td>70°</td>
</tr>
<tr>
<td>Crossing the Equator</td>
<td>80°</td>
</tr>
<tr>
<td>At 29° S. Lat.</td>
<td>70°</td>
</tr>
<tr>
<td>Nearing the Cape of Good Hope</td>
<td>60°</td>
</tr>
<tr>
<td>After rounding</td>
<td>49° 56'-60°</td>
</tr>
<tr>
<td>At 45° S. Lat.</td>
<td>40° 5-50°</td>
</tr>
<tr>
<td>At 90° E Long.</td>
<td>50°</td>
</tr>
<tr>
<td>Nearing Australia</td>
<td>60°</td>
</tr>
</tbody>
</table>

If the voyage be made in the summer, May is the best time to leave England reaching Australia in August. The temperature is about the same as above. The homeward voyage by Cape Town is more risky on account of the
danger of catching cold when rounding the Cape due to the lower temperature on nearing the Antarctic Circle. The temperature is about as follows:

Leaving Wellington New Zealand in April 55°-50°
At 50° S. Lat. & 130° W. Long. 40°
Off Cape Horn 38°-40°
At 40° S. Lat. 50°
At 35° S. Lat. 60°
Off MonteVideo 70°
At the Equator 80°
Off the Azores 70°

Reaching England the middle of July.

The full benefit of the voyage is not felt for a week or two after starting; as the weather gets warmer the cough & irritability of the system diminishes. The appetite increases & the general health improves. Dr. MacLaren considers the first part of the voyage, before the southeast trade-winds are
encountered, to be sedative, & the last part tonic in its action.

Dr. Williams gives a good description of the two principal conditions of the phthisical patient during one of these voyages;—he says (p. 104)

An invalid seated on the deck of a fine clipper built ship in a southern latitude (say 27°) x x is placed under some of the best hygienic conditions possible. He breathes the purest of air

experiences at any rate one form of passive exercise without fatigue or fear of chill: he is supplied plentifully with good food in fair variety

for which he has an appetite and slipping even the continued succession of meals.

But when he retires to his cabin, & if he should be confined to it by bad weather or illness, the conditions are surely somewhat changed.
in his own house, would be considered a cupboard, but a poorly ventilated one, especially when dirty weather requires the portholes to be closed, he is jolted about by every motion of the vessel, and in all probability is tormented by sea-sickness. It must be conceded that this view of the picture is not a cheerful one and contrasts unfavourably with the quiet nights in lofty bed-rooms which are obtainable in land sanitaria. Dr. Williams mentions the case of "a medical man, aged 39, complaining of cough and loss of flesh" for 7 months. He had been overworked in practice for 9 months before had had haemoptysis to "a pint and a half" a day for a few days before. There were also night-sweats and loss of appetite. On examination there was
more or less dulness found over the whole of the front of the right lung with absence of breath sound & bronchophony in the lower fourth; tubular sounds were audible at & above the right scapula, with some crepitations under the clavicle. The patient was recommended to continue with cod-liver oil, to use iodine externally & to take a voyage to Australia. He therefore spent 2 years as ship-surgeon on an Australian vessel during which period he gained nearly 2 stones; his cough was much less, & he was strong enough to resume his heavy town practice. Five years after he had congestion of the right lung; after his recovery, on examination, flattening & slight dulness were found over the upper third of the right chest; scattered crepitations was most marked
in the mammary region. She had become quite stout, somewhat short-breathed, had no cough or other pulmonary symptoms.

The Suez or Red Sea route to Australia has not the same advantages as the one round the Cape, as it has less of the oceanic influence and equalibility of temperature which shows but little variation at different seasons of the year. During the first part of the voyage the temperature is nearly the same as the Cape route. On leaving Gibraltar at the end of October the temp is about 61°. After passing the Strait of Malta 60°-70° off Malta. In the Suez Canal 81°. Occasionally falling to 65°. At Suez 84°. Halfway down Red Sea 85°-87° in summer 98°.
At Aden

83° to 84°

After entering Arabian Sea 79°
Up to Bombay 79° to 81°

The rest of the voyage is much the same as on the Atlantic.
To the Cape & back is a very good voyage, as it avoids the worst part of the Australian
zone viz. the cold weather on nearing the Antarctic Circle. It can be made at any
time of the year, but is best so as to avoid our cold weather.
To New York & back may be very beneficial in the
summer as far as it goes, but the distance, or rather
the time taken, is somewhat short. The tempera-
ture varies from 70° F.
on leaving Liverpool to
80° on reaching New York.
Great cold may occasion
all the experienced of the
ship should come across
icerys. Many physical
patients with double cavities
have lost the cough & gained
appetite & strength by even
this short trip.

When we consider the large in-
creased immunity from phthisis possessed
by those living at high altitudes
as well as several cases in which
the greatest benefit has been derived
from a prolonged residence at
a great elevation; then seems
to the little doubt but that in
the future, with the further
extension of railways & other
accommodation, this will be-
come a favourite & reliable
means of treatment of this
dread malady.

In Europe, the high parts
of Switzerland particularly Davos
Plate in the Tiroons, have been
recommended by many eminent
English physicians as wintering
places for physical invalids.
This place is situated in a valley 14 miles long & 500 yds to 1000 yards broad at an elevation of 5700 ft & is surrounded by Alps ranging to nearly 9000 ft. It has a population of from 3000 to 4000, a good hotel, & other accommodation. It is described as having great dryness & clearness of the atmosphere, & so great is the power of the sun's rays that with a temperature of only 20° or 25° F. in the shade many invalids are able to sit in the open air without great coats or wraps.

In the United States, the Great Rains among the Rocky Mountains at an elevation of from 5000 ft to 6000 ft seem to offer many suitable places of residence for phthisical patients. The climate is said to be dry.
"equable, & temperate, allowing even to invalids a completely outdoor life. Colorado, Denver, 
Santa Fe, are easy of access by the Pacific railway & offer good accommodation to the 
traveller. Several of the higher stations on the western slope of the Central Pacific line have 
also been recommended as Tahoe city, opposite the lake of the same name—a lovely spot amidst 
pine-clad hills & commanding fine views of the mountains. Having excellent fishing on the 
lake, & a good hotel (P. Williams)."

The Andes of South America have a great choice of sanitas 
at various altitudes most of 
which have the advantage of remarkable dryness on the 
whole of this western slopes 
owing to the great inequality of the distribution of the 
Drainage nearly all of which 
appears to go down the eastern
side of the watershed. Among
its varied latitude and the peculiar
conformation of the country,
The Andes have every variety
of climate in a comparatively
small space; there are extensive
plains at great elevations scattered
over with populous towns among
which may be mentioned.

Quito near the equator at an
elevation of 9,151 ft.
Santa Fé de Bogota at 8,648 ft.
La Paz at 13,325 ft.
Aguas Calientes at 9,000 ft.
Cuenca at 10,000 ft.
Lima at 10,028 ft.
San Blas at 10,418 ft.

Quito, the capital of Ecuador,
has a population of over 80,000
and an elevation of nearly 10,000 ft.
It is situated on the east side
of Pichincha and is surrounded
by some of the grandest peaks
of the Andes, but is very
subject to volcanic earthquakes.
The temperature is very equable.
the mean being about 60° F. The climate is described as a perpetual spring.

Santa Fe di Bogota, the capital of New Granada, has a population of 40,000 and an elevation of nearly 9,000 ft. It stands on a plain 10 miles in length & 30 in breadth & has a climate like Malaga, the mean annual & winter temperature being the same viz 59° F. with few extremes, furnishing an equable climate with moderate warmth. It has good hotel accommodation, good & medical aid & is on the road between Quito & the Caribbean Sea, making it pretty accessible.

La Paz, the capital of Bolivia (elevation 13,328 ft.) has a good French hotel & a dry bracing climate but is rather too frosty for most phthisical patients.
Arequipa at an elevation of 9,000 ft has a good hotel and is reached from its port Camana on the Pacific.

Arequipa at an elevation of 10,000 ft stands on a plateau 44 miles long & 17 miles wide separating the two ranges of Andes. It is well drained by the Mantaro, a tributary of the Amazon. The soil is alluvial with a calcareous understratum. There are two seasons, a dry cold one, extending from March to August, at the end of which post occurs, & minds are most felt; a rainy, hot season from September to February. The extremes of climate are not great, the temperature varies from 28° F. to 67° F. (in the shade) The sun's rays are very powerful in their direct influence which is so...
great heat in the full sunshine the temperature may be 122°F. in the shade only
30°F. The atmosphere is very clear, dry, owing to the rapid evaporation &
drainage. Iron & steel are said never to rust. Stars can be seen in the daytime.
The prevailing winds are southwest in the evening & northeast in the morning.
These blow occasionally with great force. Sanja has been used by the Peruvian
government as a military hospital for consumptives & it has long been the
custom at Lima & Larca where who phthisis is prevalent "to send the patient
to this place at which 79 p.c. are reported by Dr. Fuentes to recover." (Dr. William B.)
The journey to Sanja takes about 3 days from Callao.
the port of Lima (6 miles distant from it). On the 1st day by rail, 2 hours after leaving Lima, Chosica is passed. This is a fashionable resort at an elevation of 3,500 ft. possessing a fine climate, but not sufficiently high for the treatment of phthisis. By the end of the 1st day, Aroya is reached; the Peruvian Andes Railway crossing the first ridge at an elevation of 16,400 ft. The 2nd day's journey is on horseback to Tarma reaching Jauja on the 3rd day; when the new railway is finished the time taken for the journey will most likely be reduced to 2 days.

Tarma (mentioned above) is about 20 miles to the north-west of Jauja. It is situated in a narrow valley near a running stream, at
an elevation of 10,028 ft. It has a population of 5700 or 6000 & a higher mean temperature & more variable climate than Janya.

Huancayo is a larger town than Farma & is situated about 115 miles to the north of Janya at an elevation of 10,718 ft. It has a climate intermediate between the two last named towns & is well spoken of as a sanitarium.

Dr. Guilbert mentions a case of the arrest of phthisis from a "prolonged residence in these mountains." (Dr. Williams, p. 211.) One of them is so remarkable as illustrating the influence of climate that I will quote the case at length as given by Dr. Williams, - he says: A Swiss clockmaker, aged 20, who had lost both parents from consumption, was
attacked with cough & large hemoptysis, followed by loss of flesh & night-sweats. He was recommended a change of climate, & accordingly repaired to America, & set up a watchmaker's shop at Panama, a low-lying town situated on the isthmus of that name. Here the disease progressed; & following advice, he travelled to Quito, in the Andes, 9000 ft above the sea-level, where he remained six months, at the end of which period he had regained his original weight, lost the fever & night-sweats, & had an excellent appetite & scarcely any cough. He returned to Panama, & led a temperate & moderate life; but after some months the cough, night-sweats, & fever all returned, accompanied by diarrhoea & wasting. A second visit to Quito was
recommended, & carried out with the same favourable results, & a return to Panama with the same unfavourable ones. A third journey was then made to Quito, where he remained nine months, & was strong enough to visit some of the higher mountains of the range, though it is not recorded that he performed any mountaineering feats. He returned to Panama so well that he had a firm conviction that he was cured; but he never lost his cough, & a recurrence of his symptoms soon drove him to the heights. This time he chose Arequipa, a town lying between 8,000 & 9,000 ft. above the sea, & here for the fifth time he regained his health; but, with a strange fatality, he quitted the mountains &
retired to Lima, a place at a considerably lower level. Some time afterwards Dr. Guilbert examined him, & described him as in a state of terrible emaciation, looking more like a corpse than a living being, suffering from fever & night sweats, with entire loss of appetite, diarrhoea, & a troublesome fistula, having severe cough & large expectoration. He also detected the existence of cavities in both lungs, & scattered crepitations at the bases, & having prescribed palliatives, he quitted the patient under the impression that he should see his face no more. But he was mistaken. Dr. Guilbert ascended to La Paz, the capital of Bolivia, at an altitude of 13,500 ft., & here shortly afterwards the patient turned up, having followed his doctor more
slowly, & now astonishing him by his rapid improvement. The fever, sweats, diarrhoea, had all disappeared; the expectoration had diminished; the appetite returned; & during some excursions they made together the patient is reported to have walked as well as the doctor, & to have been free from the 'soroche,' or mountain-sickness, which is troublesome to new comers in these parts. The cavities remained unchanged. Thus for the seventh time the Hindus rescued him from the jaws of death; & it had been well if he had clung to them. Unfortunately he returned to Europe & Neu-Chatel on private business; the disease made fresh progress; he was ordered to Caun Bonnes, & died there a few days after his arrival.
Dr. Hermann Weber & Dr. Archibald Smith speak of the Andes as giving "by far the most successful results of the curative influence of high mountain climates on phthisis." Dr. J. B. Williams & Dr. Walshe have both published interesting cases of arrest in these regions.

In India, the hill countries of the Nilgiris range at an elevation of from 6,000 to 9,000 ft. seem to be most recommended. The temperature varies from $54^\circ$ to $70^\circ$F, they have an equable climate but a large rainfall particularly on the western side. Some of their stations have been greatly praised as sanitaria (Dr. Williams' 1872).

The Himalayan stations are as a rule at an elevation of from 6,000 ft. to 8,000 ft. and have a temperature ranging
from 40° F. in the winter to 78° F. in the summer. The rainy season lasts from June to September when there is a large rainfall, the rest of the year they are said to have a very invigorating climate but rather hotter than England. The principal differences between the Indian sanitaria & those of the North are the greater altitude, the more equable temperature & the smaller rainfall & quantity of moisture in the atmosphere of the latter. The Indus are remarkably dry whilst the Himalayas have a very large share of rain. Another objection used against the Himalayan station is the configuration of the country, which consists of more or less precipitous rocks & deep valleys separating them, the mountain plateaux being small & not extensive enough.
to admit of abundant exercise for the convalescents.

Dr. Wise in his "Effects of High Altitude on Phthisis" (p. 38 et seq.) gives the following (favorable in) meteorological conditions: * their effects on the lung, which are not uninteresting.

1. Dryness of the atmosphere & its comparative freedom from mechanical irritants, germs etc.
2. Propinquity of sunlight with a low temperature.
3. Absence of high winds.
4. Diminished barometric pressure.

"Physiological results on the Pulmonary complaints:

1. Tessedus irritation of the respiratory tract from absence of dust.
2. Evaporation of morbid secretions in the lungs, promoted by reduced barometric pressure & dryness of the
as the result of his observations on different climates Dr. Williams considers, that for the ordinary forms of consumption, a dry air, whether inland or marine,
is better than a moist one, inland or marine, cold or hot: always excluding the exceptional instances of sea-voyages? (p. 115.) He gives as the principal disadvantages of the Andes treatment: (p. 128)

"The great elevations to which a patient must ascend before the best sanitaria can be reached whilst the change of climate may induce catarhal and other affections as the soroche or mountain sickness before alluded to; though the accommodation is tolerable it is Spanish and an invalid will have to deal with Spanish habits and Spanish food, both of which are often distasteful to English ideas."

These objections seem small when compared with the great advantages which as we have seen,
have been derived from a residence at a high elevation, as well as the great immunity from pulvisis which high altitudes enjoy; for in no case that I can find were the benefits received so remarkable as those experienced by the Swiss clockmaker, already quoted (p. 98.) on each occasion that he returned to the higher regions; one would suppose that a considerable amount of inconvenience from tedious travelling, change of climate, indifferent accommodation, etc., would be tolerated when such great benefits might be confidently expected.

I cannot do better than conclude this paper by quoting from Dr. Williams'
excellent rules for the climatic treatment of phthisis. (p. 139 of)
as we have to bear in mind
that there are other circum-
stances such as, the means,
temperament & inclinations
of our patients to be con-
sulted as well as the bare
scientific facts of the cases
under treatment.

1. If a phthisical patient in
any stage can take plenty
of exercise without catching
a cold & if his appetite be
good, his weight increasing,
& his cough diminishing
he had better remain at
home & trust to home-
treatment & dietary. If
however he cannot take
exercise without catching
cold & when confined to
the house loses appetite
becomes low spirited &
prines for a change of air
& scene, & above all if confinement impaire the digestive
organs causing biliousness
& disinclination to cod-
line oil, he had better
try another climate if
his strength permit.

Many consumptives profit
more by food than climate;
these had better stop at home
& try the south of England
as well as advanced cases
& those with great pulmon-
ary & gastric irritation
unless they are specially
anxious to winter abroad.

On the other hand, first-
stages, & even where the
consolidation is extensive,
if the consumptive disease
arise from inflammatory
& catarhal attacks, & if
it be confined to one lung,
do well to leave England;
& we may also advise
the same to third-stage-
cases, where the monoea is small & quiescent.

2. Sea voyages should be recommended with very great caution. The cases which seem to profit most by them are: first, haemorrhagic ones; second, where there is "limited consolidation with no pyrexia" in young men with close & unhealthy indoor occupations.

3. A dry climate is most likely to arrest the disease, taken as a whole; & a dry & moderately warm one, when it is of inflammatory origin. A cold dry climate is preferable if the invalid has sufficient power to maintain the circulation at a temperature so as to be a good deal in the open air. Elevation is of great importance both
on account of the purity of the air and its low barometric pressure and rarefaction which causes "the expansion of the lungs in chronic first-stage cases."

4. "Phthisis of catarhal origin is the one exception which has been shown to profit most by a warm & equable climate even though accompanied by a certain amount of moisture."

"Finally, in all climate questions full note must be taken of the patient's inclinations, means, & above all, of his disposition & temperament; & while must not be deemed to those who are incapable of making themselves happy under the changed conditions of life, or all our scientific grounds for a climate
decisions may collapse. +
Climate is only one
portion of the system of
attack which we organize
against the dread foe
which decimates our
population. It would be
worth little if not
combined with medicine
and hygiene, & a determined
will to wrestle bravely
against the home-thrusting
enemy.