Alexander Fisher

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On Climate, and its Influence on Health and Mortality.

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Alexander Fisher.

Study in pre Competition by Sir J. Ballingall

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On

The Influence of Climate on Health and Mortality.

It is proposed in the following essay to examine, briefly, what constitutes Climate, the causes of its variations, the influence, which it exercises, on the health and mortality of the Indigenous Inhabitants of different quarters of the globe, and its influence on the Health and Mortality of those, who emigrate from their native country to other places, possessing a considerably different Climate. In the Consideration of which, we shall adopt the following arrangement.

Firstly. A general description of Climate, and the causes of its variations.

Secondly. After a few remarks on the Climate of the Torrid Zone, we shall, briefly, describe the indigenous Inhabitants, with a statement of the ratio of mortality, sickness and prevailing diseases, so far as we have been able to obtain information.

Thirdly. We shall, in a similar manner, describe the Climate, and Indigenous Inhabitants of the Temperate Zone, with the rate of mortality, sickness, and prevailing diseases among them.

Fourthly. We shall examine, the results, which follow on the removal of the natives of the Tropics, to the Temperate Zone.

Fifthly. The Influence, which the climate of the Torrid Zone exercises on the natives of temperate regions, so far as regards the mortality, sickness and prevailing diseases, will form the last subject for consideration.

Chapter I.

A general description of Climate, its constituents, and variations. - The Snow line - Fall of Rain — Winds.

Climate, in its fullest sense, offers to the natural philosopher, a field of inquiry, of the highest interest and importance, but at the same time, its proper consideration, is a subject of no ordinary difficulty, since most of the physical sciences, fall within its compass.

"The expression Climate, taken in its most general acceptation" says Baron Humboldt "signifies all those modifications of the atmosphere, which sensibly affect our organs," such as the temperature, the humidity, the variations of Barometric pressure, the calm state of the air, or the effects of different winds, the amount of electric tension, the purity of the atmosphere, or its mixture with more or less deleterious gases or exhalations, and lastly the degree of habitual transparency of the air, and serenity of the sky, so important, on account of the influence, which it exercises, not only on the solar radiation, on the developement of the vegetable organic tissues, and the ripening of fruits, but also on the feelings and whole mental disposition of man" -

"The operation and influence of Climate, as a means, either of causing or of curing disease, have long been admitted, and all intelligent physicians have agreed in recognising, the beneficial effects, of moving from a country, where the weather and temperature are variable, or liable

to extreme vicissitudes, to one, where they are more steady, subject to fewer irregularities, and in which the changes take place, in such a manner, that they may be guarded against and so their evil results ob=
=viated. The truth of all this is recognised, but it belongs to the physician, diligently to compare, the results of a mathematical theory of the distribution of heat, from facts collected with care, and to de=
=termine in any chosen locality, the mean temperature of the year, month, day and even hour; so that he may select, for his patients, the countries and districts, the climates of which, are best suited to their different diseases, or to the different stages of the same disease.

Patients may be, and have been sent, from cold, or at least cool and temperate regions, to others, in which the air is warm or hot, perhaps dry, perhaps moist, and their diseases instead of being mitigated, have been aggravated, & their progress and fatal termination accelerated, such results mainly owing to the circumstance that the climate, has not been adapted to the stage of the disease. —

If the Earth, had been composed of a large homogeneous mass, either solid or fluid, each part resembling the others in every particular, of the same colour and density, absorbing and radiating the sun's rays equally, then the Temperature would diminish in a stated proportion, from the Equator to the Poles, in short, the Isothermal, Isotheral, and Isochimenal, Lines would all be parallel to the Equator, and each other, and would be indicated by the parallels of Latitude — But, that such is not the case, both Science and Experience teach: and

we easily find reasons for such irregularity of Temperature and Climate. The Elevation above the level of the ocean, and the vicinity of the sea or high lands, with other causes to be afterwards enumerated, affect the Temperature, which attribute of Climate, is the most obvious, so much, that in places of the same Latitude, and even within a few miles of each other, we have results very dissimilar, as the ardent heat of the Torrid Zone, bordering on the freezing cold of an arctic winter.-

In order to the proper study of Climate and its effects on animals and vegetables, it is necessary to know something of the mean annual, mean summer and mean winter temperatures, of the different regions and their relations to each other as shown by the Isothermal, Isotheral and Isochimenal Lines. Baron Humboldt has divided the Northern Hemisphere according to their Isothermal lines - as.

The 1st Zone including those places, with a mean annual temperature of from 82° to 77° Fahr.
" 2nd " " " " " " " " " " 77° " 68°.
" 3rd " " " " " " " " " " 68° " 59°.
" 4th " " " " " " " " " " 59° " 50°.
" 5th " " " " " " " " " " 50° " 41°.
" 6th " " " " " " " " " " 41° " 32°.
" 7th " " " " " " " " " " 32° " 23°.
" 8th " " " " " " " " " " 23° " 14°.
" 9th " " " " " " " " " " 14° " 5°.
" 10th " Zone comprising the Polar Regions.

* From Prof. Traill's Medical Jurisprudence. Page 197-198.

Humboldt has also divided the northern hemisphere into six isothermal bands. each characterized by the production of some vegetable of use to man.- being the first six of the former division.*

1st. This Isothermal Band is the region of Palms and Bananas. with a mean temperature above 77° F. Limits in O.W. Lat 32°. - in N.W. Lat 23½°.

2nd. Region of the Citron with a mean temperature of from 77° to 68° F. limits in O.W. Lat 37° to 38°. - in N.W. Lat 29°.

3rd. Region of the Vine and Olive with a mean temperature of from 68° to 59°.

4th. Region of the Vine. Wheat and Evergreen Oak, with a mean temperature from 59° to 50°. Limits in O.W. (Europe) Lat 52°25'. (China) Lat 40°. in N.W. Lat 42°25'.

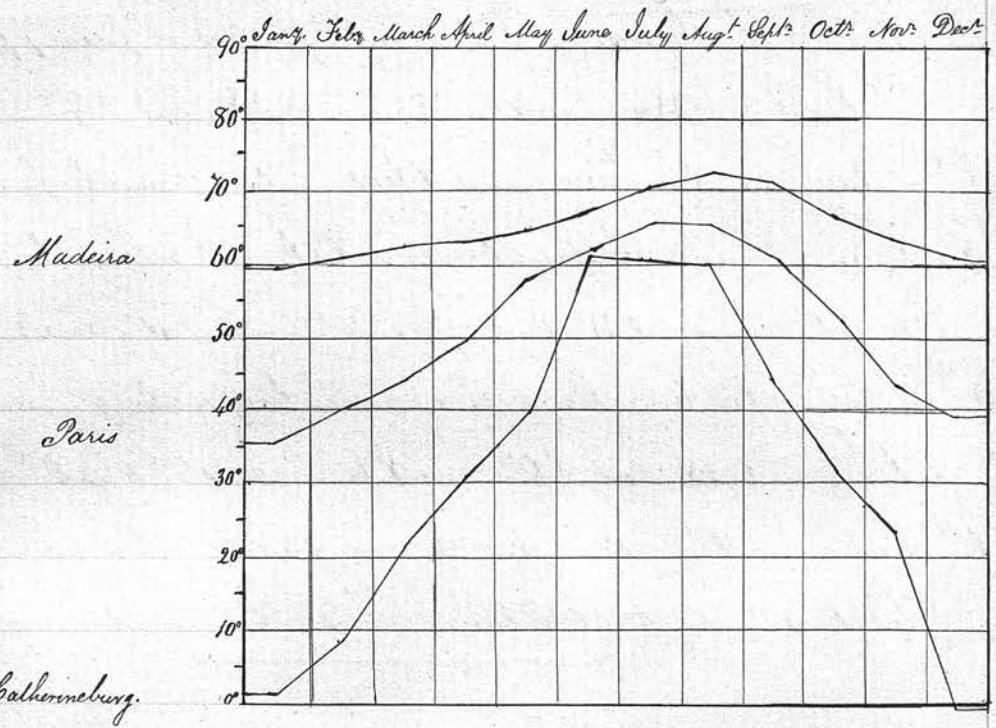
5th. Region of the Cerealia with a mean temperature from 50° to 41°. Limits in O.W. Lat 60°. in N.W. Lat 48° to 50°.

6th Region of the Pine. Birch and Willow with a mean temperature, from 41° to 32°. limits in O.W. (Europe) Lat 71°. (Asia) Lat 66°. in N.W. Lat. 57°8'.

Humboldt again has formed climates into three classes. Constant. Variable and Excessive.

The Constant climates are those, which present little difference, between the maximum of heat and the minimum of cold in the course of the year. The Variable Climates are those which present considerable differences in the mean temperatures of the seasons. The Excessive Climates are those which present very great differences. In illustration the following table is subjoined, extracted from "Becquerelle's Elements de Physique"

The following diagram is intended to illustrate, Constant, Variable, and Excessive Climates. Madeira = Constant. Paris = Variable, and Catherineburg, (Lat. 56°48' N. Long. 60°35' E.) = the Excessive.



Mean monthly temperatures as above.

	Janry.	Febry	March	April	May	June.	July.	Augt	Septr	Octr	Novr	Decr
Madeira.	59°.71	60°.28	61°.86	62°.03	63°.44	66°.9	70°.04,	71°.88.	71°.28.	66°.76.	63°.96.	61°.44.
Paris.	35°.6	40°.5	43°.5	49°.6	58°.1	62°.5,	65°.7.	65°.2.	60°.4,	52°.4,	44°.2,	39°.2.
Catherineburg.	2°.2,	8°.	22°.	31°.	40°.	62°.	61°.	60°.	44°.	31°.5.	23°.	−0°.5.

and corrected to Fahrenheit's scale:

		Mean T. of Year.	M. T. of warmest month.	M. T. of Coldest.	Difference
Constant Climate:	Funchal:	68½°	75½°	63°	12½°
	St. Malo:	54°	67°	42°	25°
Variable Climates:	Paris:	51½°	65½°	36°	29½°
	London:	50½°	64½°	38°	26½°
	New York:	54°	81°	27½°	53½°
Excessive Climates:	Pekin	55°	84½°	24½°	60°

In the present state of our globe, the Isothermal lines preserve their parallelism only in the neighbourhood of the Equator, and in general throughout the Torrid Zone: but even there, it is only in comparison with the course of the Isothermal lines of places beyond the Tropics. If only one cause were in operation, in the augmentation or diminution, of the mean temperature of a place then it might be easily reduced to a fixed law. but so many causes unite, in producing the irregularities of the lines of mean temperature, that it is utterly impossible to frame a law, which could shew anything satisfactory regarding them.

The causes of the irregularities of these lines may be classed under two heads: First. Those causes which tend to depress the temperature, and, Secondly. Those which tend to exalt it.

To the latter class belong: the relations and connections of the land, having a continent in the same longitude, stretching unbroken towards the Equator: in its having an ocean free from ice, in the direction of the Poles: the intersection of the land by branches of the sea, forming islands and peninsulas: the vicinity of a west coast in the temperate zone & the prevalence of westerly and southerly winds in such a position: the presence of mountain ranges, which serve as a screen from the winds of colder regions: the absence of swamps and forests, which exercise a great influence on the humidity of a country: the uniform serenity of the sky during summer: and lastly the proximity of some ocean current, bringing the waters of a more elevated temperature, than that of the neighbouring seas, in contact with its shores--

Among the former class of causes which depress the temperature, we may enumerate the following, in general the opposite of the above = the general elevation above the level of the ocean, with the absence of extensive plains; there being a wide expanse of land or frozen ocean, connecting the country with the Polar regions; if instead of land stretching towards the equator, there be an ocean: a wide extent of continent, unbroken by the sea into islands and peninsulas: the vicinity of an east coast in Temperate and Higher latitudes: the presence of mountains screening the country from the warmer winds, and bringing the cold winds to bear more particularly upon it: the presence of forests & swamps, which latter form masses of ice, lasting into the middle of summer, and radiating cold to the surrounding country: and

* Humboldt's Asie Centrale tom: iij page 155.

a misty or overcast summer sky, which intercepts and diminishes the effects of the sun's rays: and lastly a winter sky free from clouds:-

It is not our intention, in the present essay, even if its limits would admit of it, to discuss those causes at any length, but we shall give some examples of each, for the sake of illustration; - to consider them properly, it would be necessary to examine each separately, and its effects, when in conjunction with the sun as a heating body, whose elevation or declineation, is the principal source of the variation of the temperature of any place.

Examples of the influence of land and water, being as it were interspersed, are numerous and striking, when we compare the mean temperature of places near the sea coast, with that of those in the centre of large continents, the following table extracted from Humboldt's Asie Centrale tom iij. where a much larger list may be found, will sufficiently exemplify this.*

	Latitude	Mean annual Temperature	Mean winter Temperature	Mean Summer Temperature	Difference
Buda, (Hungary	47°29' N.	50½° Fahr.	30°	70°	40°
Nantes, (France)	47°13' N.	54½°	40°	66°	26°
Vienna,	48°12' N.	50°	32½°	68½°	36½°
St. Malo, (France)	48°39' N.	53½°	42¼°	66°	23¾°
Kasan, (Russia)	55°48' N.	36°	6¼°	62½°	56¼°
Edinburgh,	55°57' N.	47½°	38½°	58°	19½°
Copenhagen	55°41' N.	47°	31½°	63°	31½°

By the above table we see, that on comparing Edinburgh and Kasan, places in almost the same Latitude, the difference in the mean winter temperatures,

exceeds the difference in the mean summer temperatures, the former having a difference of 32¼°, and the latter of 4½° and these differences are in opposite directions, and we also see that the difference between the mean temperatures of summer and winter at Edinburgh, which is 19½°, far exceeded by the difference between those same at Hasan, where it is 56¼°, The Climate of Hasan certainly deserves the appellation of Excessive

In the same manner, we shall find that similar results obtain, although on a smaller scale, when we compare the mean temperatures of places, nearer each other, but differently situated as regards sea: for example The mean annual temperature at Paris is about 51½°, at London 50½°, at Haarlem 50°, at Dublin 49°, and at Edinburgh 47½°, Here we see that although Edinburgh be 7°7' further north than Paris, the mean annual temperature has only decreased 4°, whilst if it decreased in the ratio, that the mean annual temperature is calculated to decrease, (namely, 1°:1 to the degree of Latitude) it would be about 8° less than that of Paris.

At Dublin the mean heat of August only attains the height of 60°8, while in Hungary, under the same isothermal line, it averages 69°8. Still on the contrary the month of January, averages in Hungary 28°4. and even in Lombardy on the isothermal line of Pavia & Milan 33°8, while it reaches at Dublin to 39°8. In the Faroe Isles the little lakes are not covered with ice during winter, although their Latitude is 62° N. there the mean winter temperature is 39°8, whilst that of Summer, seldom or never exceeds 53°.

The difference between the climate of the interior of a continent, heated to excess in summer, and covered during winter with snow, and the climate,

* Humboldt's Asie Centrale tom iii page 188.

of the islands or sea boards, is very well seen by the influence which it exercises on vegetation. In the N.E. of Ireland, the myrtle flourishes, as well as in Portugal, while in winter it seldom freezes, the heat of summer is insufficient to bring the grape to maturity; the ripening of that fruit depending more on the mean temperature of Summer, than on that of the year.

The following examples are intended to show the influence of an east or west coast, and may also suffice as illustrations of how the temperature is depressed by the land being connected to the Polar Regions by land or ice, and separated from the Equator by water.

On comparing places in America with places of the same latitude in Europe, we are struck by the difference in mean temperature shown by such comparison. Places situated on the east coast of America have a mean annual temperature, much less than that enjoyed by places of the same latitude on the west coast of Europe. Sometimes the difference is 11° or even 17° and places with a like mean annual temperature, have sometimes a difference of Latitude of from 7° to 13°.

Table of Examples. from Humboldt's Asie Centrale.*

Places having the same latitude

	Latitude	Mean annual Temperature	Difference
Nain, (Labrador.)	57°10′ N.	25½°	20½°
Gottenburg.	57° N.	46°	
St. John's	47°34′ N.	38⅓°	13⅙°
Paris	48°50′ N.	51½	

continued over.

* Humboldt's Asie Centrale ~~tom. iii~~ page 189.

** Sir James Clarke on Climate. 4th Edition page 271.

	Latitude	Mean annual Temperature	Difference
Halifax,	44°39′ N.	43°	14°
Bordeaux.	44°50′ N.	57°	
New York,	40°43′ N.	53½°	7½°
Naples,	40°51′ N.	61°	
Washington,	38°51′ N.	55°	6½°
Lisbon.	38°52′ N.	61½°	

Table II *

To what Latitudes in Europe, some places in N. America, correspond as to their mean temperature in

Nain, in Latitude	57°10′ N	corresponds to Lapland.	68°40′ N.
St John's,	47°34′ N	St Petersburgh	59°56 N.
Halifax,	44°39′ N.	Konigsberg.	54°43′ N.
Washington,	38°51′ N.	Toulouse	43°36′ N.

As might be expected, we have the difference, between the winter and summer mean temperatures, greater in America, than in places of the same mean annual temperature, in the old world, as the following table, taken from Sir James Clarke's Treatise on Climate, may show. **

	mean annual temperature,	mean summer.	mean winter.	Differences.
St Malo:	54°5	66°	42°	24°
Cincinnati:	53°7	72°9	32°9	40°
Nantes	55°6	70°7	42°2	28°5
New York	53°8	79°2	29°8	49°4
Bordeaux	56°5	70°7	42°1	28°6
Philadelphia,	54°9	73°9	32°2	41°7

Several different causes are at work, to produce the effect shewn by the foregoing tables. A large track of land and frozen ocean, prolong North America, towards the Poles: it is connected to the Equatorial regions by only a narrow slip of land. a great mountain chain, running along its interior, often or always covered with snow, tends much to cool the climate, a large extent of its surface is covered by forests, and the places are on the east coast of America, which we have compared, with those on the west coast of Europe

Such examples as those we have now given, have very naturally led to the commonly received opinion, that places in America are colder than those of corresponding latitudes, in the old world, but this is an entirely fallacious opinion, and deduced from a one-sided view of the question. It is not the east coast of America, which we ought to compare with the west coast of Europe, it is the west coast; and we shall then find, that their mean temperature coincides remarkably. as

	Latitude	Mean annual Temperature	Difference
Iluluk, (Russian America)	53°52′ N.	39½°	
			3½°
Konigsberg,	54°43′ N.	43°	
New Archangel	57°3 N.	44½°	
			½°
Leadhills, (Scotland)	55°25′ N.	44°	
Fort George (W. of America),	46°18′ N.	50°	
			½°
Buda,	47°29′ N	50½	
Fort Vancouver	45°38′ N.	52½	
			½°
Turin,	45°4′ N.	53°	

We shall find also, that the east coast of Asia, resembles as to Temperature, the east-coast of America, and so is much colder, than the west coast of the Old World. as for instance Pekin, although about 9° further south than Paris, is of about the same mean annual temperature, although its summers are much warm-er and its winters much colder.

Such phenomena may be accounted for, by the fact that the ocean, is slow to follow the alterations in the heat of the air, thus acting as an equalizer of Climate, serving at once to temper the rigour of the winter's cold and the fervour of the summer's heat. The Cir-culation of the great ocean masses, conveying the warmth of tropical regions, to the colder parts of the Earth, have an importance of action, at present too little studied. To the east ocean current, called the Gulf Stream, which passing from the Tropics, along the American Coast, and turning eastward at Newfoundland, constantly heat-ing the German and even Polar oceans, Britain and Norway owe much of their comparative mildness. Did the isthmus of Darien not exist, that current would flow onward to the Pacific, and we would so lose its warming influence, and to make up for it we would have a current from the Northern seas, freighted with icebergs. Our islands would soon be surrounded with ice, and have the appearance of being within the Arctic circle, becoming uninhabitable, but for the presence of the Isthmus of Darien.

It is to its close proximity to the ocean, and to its being so deeply di-

=vided by arms of the sea, that Europe owes so much of its comparative mildness forming as it does, a vast peninsula to the west of Asia, it is connected with the Equatorial regions by Africa, yet with sufficient sea intervening, to temp=er the hot winds of the Sahara. On the other side, it is separated from the Polar regions by an ocean free from ice. With these advantages Europe may well be equable in its climate. Were Africa to disappear and an ocean to supply its place, Europe would become colder; were Africa, when disappearing there to occupy the place of the Arctic ocean, it would become still colder, and were Europe now to be joined to Amer=ica by land, the cold of its winters would be unbearable, as well as, would the intense heat of its summers. But here is shewn a wise arrangement of the Creator, in the land not being all clustered to=gether, but abundantly interspersed by ocean, and well stretched out, for contact with it. Tobolsk, and places of such latitude, far remov=ed from the sea, have summers as warm as those, of the south of France, but these are followed by winters of intense cold. Astrachan in Latitude, 46°22' N. with a mean annual temperature of 48½ Fahr. enjoys a mean summer temperature of 70°, whilst in the winter season the thermometer falls to −10° or even −20°. And not many years since, we had a most striking example of the winter cold of a continent, in a place much further south than Astrachan, namely, in Affghanistan, where the British troops suf=fered so much from that cause. All islands as before mentioned, are more equable in their climates than Continents, for example, when we com=pare the mean temperature of Great Britain, with that of other

*Humboldt's Asie Centrale tome III page 198.

and less favoured lands, we behold a striking disparity. At Stromness in the Orkneys, the mean winter temperature is higher than, that of Paris. Thus also the mean temperature at London, is so different from that of Cracow, and the mean temperature at Edinburgh, from those of Moscow, of Kasan, or of Slatoust in the Ural, all places of the same Latitude.

The presence of forests, has been made mention of as one, of the causes which cool a country. "Forests act, as cooling agents" says Humboldt.* "in three different ways, either in sheltering the soil from the solar rays, or in giving rise by the vital action, and transpiration of the leaves, to a strong evaporation of aqueous matters, or finally by multiplying, by the broad expanse of these appendages, the surfaces, which are susceptible of becoming cool, by evaporation" The importance of the effects of those three causes are so great, that the subject of forests is one of the most interesting in the consideration of the Climate of any country, and for its full consideration, would alone occupy the space of a long essay.

Almost in our own day, we see the good effects, of clearing away the forests, since the clearance, consequent on the great increase of the population of the United States, the mean annual temperature has advanced several degrees, while the winters are becoming less cold, the summers are becoming less warm, the mean temperatures of January and July are constantly approaching each other; there likewise many lakes and swamps have been dried up and drained, rivers which once used to inundate the country, have been confined to their own beds, and lands

once barren, are now under cultivation. According to Messrs Williams and Jefferson the clearance of the lands in the United States, have been to cause the greater frequency of the east winds, giving the settlers more facility to advance into the country. It must be remembered that in America, it is the east wind which is the warm wind, and the west the cold one, being the opposite of what obtains here.

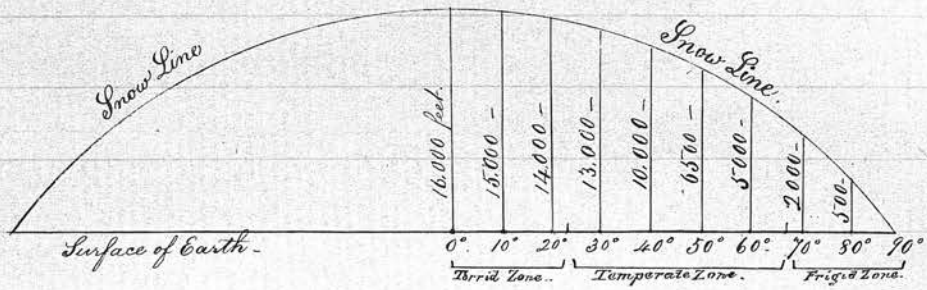
Like changes have doubtless been produced, in every country by the progress of Human society and Civilization. In Great Britain, France and Germany, where under free and able institutions, the population and the intellectual powers of the inhabitants have made rapid progress, the same Isochimenal Latitude has not been preserved, although there may be little or no change in the mean annual temperature, for we find that the climate deserves less the character of Excessive, than when Caesar and his Legions campaigned there.

The clearness of the sky, and the absence of clouds in winter, tend to cool the country by increasing the evaporation, for example, sometimes, at Canton in the colder season, from this cause, ice may be found on the terraces of houses, surrounded by palms and bananas.

The Elevation of any place above the level of the ocean, tends to diminish its temperature, as before mentioned, and we now proceed to consider shortly some facts connected with that.

As we ascend above the level of the sea the air becomes more rarefied, and the solar heat goes on diminishing until, we reach the

regions of perpetual snow, at the snow line or line of perpetual con=
=gelation. This line is highest at the Equator, where it is about 16.000 feet above the sea level, and goes on decreasing in altitude, till we approach the Poles, where it reaches the level of the ocean. This line over the surface of the globe, is intended to be shown by the following sketch, the numbers are only an approximation in round terms to the truth:



The Temperature diminishes in a regular gradation, thus at the Equator, and, in the Torrid Zone, the decrease is at the rate of 1° Fahr. for every 100 yards, of per=
=pendicular ascent, but in the Temperate only 90 yards of ascent are required to cause a fall of 1° of Fahrenheit's thermometer, at least in the begening of the ascent.

The snow line correctly speaking is always stationary, but it is often spoken of as being an oscillating line, especially in the temperate regions, near the Equator, however, this oscillatory movement is scarcely perceptible, and the line is well de=
=fined, as the variations of temperature there are inconsiderable.

As the subject of the snow line is an interesting one, we shall state some more particulars regarding it.

On the side of the Mountains, which is turned from the Sun, the Snow Line descends lower, than on that which is turned towards it, but on the highest range in the globe (The Himmaleh) a striking anomaly obtains, where, on

the South side, which is exposed to the Sun, the height of the Snow Line is 12,980·7 feet, on the north side, it reaches the altitude of 16,626·8 feet. (See Humboldt's Asie Centrale, tom. iii, where a most valuable table of the limits of the Snow Line may be found.) On the Himmalehs, the cultivation and the houses extend on the northern side, 3600 feet higher than on the southern. This strange anomaly, is to be accounted for by the fact that the plains of Tread and Little Thibet, are on the north side, These plains have an elevation of from 8 to 10 thousand feet, and over whose sandy plains, the hot wind blowing, serves to raise the snow line. If that line were as low on the Northern as it is on the Southern slope of the Himmalehs, those plains would be uninhabitable. Much information on this interesting subject may be obtained in Baron Humboldt's work, above quoted, and in Thompson's Introduction to Meteorology.)

Humboldt determines the snow line on the Andes at Quito, below the Equator, to be at a height of 15,795·5 feet. In Latitude 8°5' on the Sierra Nevada de Merida at 14,932 feet: in latitude 19° in Mexico, at 14,762 feet. On Etna 37° N. it is at the height of 9000 feet. on the Carpathians Latitude 48° N. at 8500 ft. on the Caucasus. Lat. 42°42' N at 9000 feet, on the Pyrenees Lat. 42°30' N, at 8,892 feet. If a mountain rose at Edinburgh of sufficient altitude, the snow line would be at about 6000 ft. In Norway, at Lat 60° N. at 4000 feet. at Lat. 70° N at 3000 feet: and at the Poles it reaches the margins of the ocean.

On volcanoes, the snow line is subject to variations, depending on the presence of internal heat, for example, Mount Aconagua in South

* Humboldts Asie Centrale tom. iii page 274.

America, and Lat: 32°30'S. which is higher than Chimborazo, has been seen without its snowy covering.

The following statements are the result of measurements made by Baron Humboldt, for determining the snow line on the Andes, within the Tropics-

That from the Equator to 8°. of Lat. the snow line is at a height of. 15.796. feet.

In the Torrid Zone from 16° N to 19° North Latitude. — — 14.783 ..

In the Torrid Zone, from 16° S to 19° South Latitude on the eastern Cordilleras, in Upper Peru, the snow line is at the height of. 15.898 -

In the same Latitudes on the Western Cordilleras. 18.519 --

Baron Humboldt ascribes this difference in the snow line on the two Cordill=eras. to a cause similar to that which operates on the Himmalehs. namely, the existence on the western side, of the plains of Titiaca, at a height of. 12.700 feet. He states that in the like latitude in the Northern Hemi=sphere, on the mountains of Mexico, all vegetation ceases at 12,800. or 14.000 feet. whilst in Peru, on the same mountain chain, and at a greater height, not only is there found a numerous agricultural population, but there are also villages and cities. At present, one third of the population of the high lands of Upper Peru, inhabits regions situated, much above the line, where all vegetation and cultivation, have ceased in the North=ern hemisphere, in the like latitude.*

The Height of the Snow line in any particular country depends on many circumstances, as the temperature, height and extent of the ad=jacent plains, as we have seen. on the degree of heat, and the duration of the Summers. the quantity of snow falling in winter, the direction

of the prevailing winds, the dryness and clearness of the atmosphere, the steepness of the mountain summits, and the mass of the neighbouring snows. In the interior of a continent, the snow line, ought to be higher, than towards its sides, as there less snow falls, and the summers are warmer; the snow line depending more on the heat of the summer, than on the cold of winter, as it is at the height at which the snow falling during winter, ceases to melt in the heat of summer.

On account of the gradual diminution of temperature, on the mountains of the Equator, we may there survey at one and the same time, all the varieties of vegetable form, at the base, we are in the abode of the Palms and Bananas, higher up we arrive at the region of the Cinchonas; Grapes cease at 13,400 feet, and finally, even the stunted saxifrage disappears, it is not able to bear the cold, for we have now reached the limit of eternal snow, again from the summit we may survey the beauty of the heavens, may behold the constellations of both Hemispheres from the Cross of the South to the Polar star of the North, all rendered more splendid by the clearness and rarity of the ~~sky~~ air, enabling us to see the stars with tenfold brilliancy

We know not to what height snow might be deposited, we only know its inferior limits, as the mountains of the earth are not of sufficient altitude, for the air to contain no vapour, to be frozen, and thus rendered visible.

The moisture contained in the atmosphere, and the quantity of rain which falls, in a considerable degree characterize a climate, and exert

an influence over it. Extreme dryness is exceedingly pernicious to vegetation, and in warm and tropical climates, the dry season corresponds to our winter.

As the quantity of vapour contained in the air, increases with the Temperature, and as this changes according to the Latitude, season, & height above the level of the sea, we shall expect to find that the quantity of rain which falls should increase, as we approach the equator, (other things being equal,) and that such is the case, the following table may show.

Place	Latitude	Mean annual fall of Rain, Depth in inches
Sincapore	1° 17' N.	190
Coast of Malabar	11° 5' N.	123·5
Island of Grenada	12° 8' N.	126
Savannah	22° 50' N.	102
Kingston	17° 57' N.	83
Calcutta	22° 41' N.	81
Charleston	32° 46' N.	54
Rome	41° 55' N.	38·5
Geneva	46° 12' N.	30·7
Greenwich	51° 28' N.	24·13
Birmingham	52° 29' N.	26
Liverpool	53° 23' N.	33
Edinburgh	55° 57' N.	24
St. Petersburgh	59° 54' N.	16·5
Ulleaborg	65° - N.	13·5

From the foregoing table, it may also be seen that in islands and maritime countries the fall of rain is found to be greater than in inland countries. It is also found that more rain falls in Mountainous than in flat countries, (there are more days on which) for example, among the Andes it rains almost incessantly, whilst in the flat plains of Egypt the land is parched by long drought, and the Highlands of Scotland and lake districts of England are rather notorious for receiving more than their just proportion of rain, as at Seathwaite, there falls rain to the depth annually of 131·87 inches. at Gatesgarth to 124·13 ins. at Grasmere to 121 ins &c.

For examples of how the distance inland, and altitude diminish the absolute quantity of rain, we subjoin the following. at Santa Fé de Bogota in lat. 4°36' N. at an altitude of 8684 feet. with a mean temperature of 58° F. the annual fall of rain is 39.4 inches: at Marmato. in Lat. 5°27' N. altitude 4674 ft. temperature 68°7 F. fall of rain 64 ins. on the table land of Castile it amounts to 10 inches.

Although the quantity of rain is greatest at the Equator, yet the number of rainy days is less numerous. as the following statistics may testify.— from N. Lats. 12° to 43° N. the mean number of rainy days is 78½. from Lats. 43° to 46° the mean number is 103. from 46° to 50°. it is 134. and from 51° to 60° it is 161. (From the "Journal de Physique")

In some cases, extraordinary quantities of rain fall, as at San Luis de Maranhoe in Brazil according to Humboldt. there fell in 1821. 280·7 inches and at Mahabaleswhar. (western Ghauts) Lat 18° N. - 301·5 inches

As the degree of moisture in the atmosphere increases with the temperature we have the air most moist at the Equator, for example at Ceylon common salt on exposure to the atmosphere deliquesces, glue loses its hold, and paper made in Europe by losing its size, soon becomes unfit to write upon.

In Europe the most copious rains are in the months of June, July and August, and in Britain the most permanent rains come from the South or southwest.

Winds are either constant or variable. The trade winds belong to the first class, these prevail regularly in the Pacific and Atlantic oceans, for about 30° on each side of the Equator. Their theory was long not thoroughly understood, but it is known more about now. The land under the Equator becoming heated, heats the incumbent air which thereby rises and its place is supplied by cooler air from the Poles; the heated air, floats above this cool air, in a contrary direction, i.e. towards the Poles, where becoming cooled, it is also sucked in to its old quarters again and so keeps up a continuous circulation in the atmosphere, causing the trade winds. In the Indian Ocean, the Trade winds change their course regularly every half year. They are there called the Monsoons. In the maritime countries within the Tropics there are likewise a sea and land breezes, which blow as the sea breeze towards the land during the day, and as the land breeze towards the sea during the night. These breezes are caused by the action of heat like

the Trade winds.

The subject of the constant winds is one of much interest, and much has been done on this subject, and also about the theory of Hurricanes, by the late Capt. Basil Hall.

In the Temperate zone, the direction of the winds is by no means so regular as in the Tropics. They obey no fixed law, in these latitudes, for, we find their directions changing without our being able to offer any reason for such change.

An east and north-east wind are common in Europe, coming from Asia and Siberia, they cool all the countries over which they pass. In the south of Europe, the countries are warmed by the south winds, which coming from the Sahara are in general sufficiently cooled by passing the Mediterranean sea, not to be hurtful, although Malta and the coast of Spain are sometimes oppressed by that wind.

Westerly winds are more common, than easterly ones in Great Britain, in the proportion of 225 to 140 and northerly winds are to southerly ones as 192 to 173.

Mountains serve to shelter from cold winds as, for instance, the west side of Italy is sheltered from the cold North-east winds, by the Alps and Appennines.

In the south temperate zone, the winds are probably more constant and milder, than in the Northern, as also the climate is more equable from the large proportion, which the sea bears to the land.

* At Palermo, which has a mean temperature of 62½°. the date is cultivated, but the fruit does not ripen, the same takes place in Catania, with a mean temperature 2° or 3° higher, but in Algiers. with a mean temperature of 69° Dates ripen.

** This is the mean annual temperature of Las Palmas in the Canaries. at Cairo with a mean temperature of 72° the vine does not grow: nor at Abouchere in Persia with a mean temperature of 75°.

Having now briefly considered, the different constituents of Climate, we may here devote a small space, to the consideration of the climates of ancient times, and see whether any differences have taken place, in them.

As we know that the temperature of the Earth's surface, has not sensibly changed, we may be led to infer, that the temperature remains much the same, now, as formerly, and that such is the case the following observations may show. Although in some special localities, the climate appears to have undergone changes, these are to be attributed to peculiar causes being in operation, there, as Cultivation &c.

At Jericho, in the time of Moses, Dates ripened, and the vine was cultivated to make wine. Now as the Date requires a mean annual temperature of at least 69°. Jericho must have had that mean annual temperature*. Again as the Vine cannot be cultivated with a mean annual temperature above 70° or 71°.** we conclude that the mean temperature at Jericho could not exceed that: consequently we infer that the mean annual temperature of Palestine, near Jericho did not exceed 70½°. Now from recent calculations the mean annual temperature at Jerusalem, at present, is proved, to be about 70°. It follows that in the course of more than 3000 years the mean temperature of Palestine, has undergone very little sensible alteration.

Again by different calculations made by M. Arago, it appears,

So in Scotland, especially in the Valleys,
they have straight plains in the mountains
where they have a tradition, that Venus rose
riposed — but now riposeth

that the Cevennes and neighbouring country, have not changed in any sensible manner, their climate. However, in some localities in France, &c. the Climate has been considerably modified, by causes, which have already been mentioned, for example; in the Vivarais, the sum= =mers were formerly much warmer, than they are now. so much so, that there, in the middle of the 16th century, the vine was pro= =ductive at an elevation of 1969 feet above the sea level, where now the grape does not ripen, even with the best exposures. At Paris, the Emperor Julian, had at his table, wine of Vincennes, which is not now considered drinkable, the Wines of Beauvais and Etampes, which were used in the time of Philipe Augustus, have now no strength. In the present day, the cultivation of the Vine, has its northern limit in the department of the Loire, about Lat. 47° N.

We find, that like changes, have taken place in England, where the Vine was, in ancient times, cultivated, but in whose southern counties now a days, the grape ripens, with difficulty, and that only by protecting the plant from the cold winds.

We cannot so easily, however, determine the ancient mean temperature of the countries of Europe, as in the foregoing case of Palestine, from want of data. Diodorus of Sicily says that in France, the rivers were so frozen that, the heaviest carriages could cross on the ice, and it is well Known that the rivers Rhine, Danube &c, are frequently frozen in our days. From this fact, however, it cannot be determined, whether the Climate has changed or not; for M. Arago has observed, that an

exceptional freezing. such as that, cannot characterize a climate, as different circumstances may accidentally cause, the very cold and dry strata, situated in the higher regions of the atmosphere, to descend on a particular point of the Globe, that the natural cold of these strata, and the cold resulting from the evaporation, caused by their dryness, added to that which is caused during the night by the radiation of the Caloric into space (if the atmosphere be serene) appear sufficient to cause the freezing of rivers in any part of the Globe.

We have now in a brief manner, considered the different constituents of Climate, and the causes, which operate to produce changes on it. Its full consideration, would require, we may say, volumns. as it stands at present, much requires to be done for its thorough elucidation, and any one, turning their attention towards it would find it a subject of much interest and importance. Baron Humboldt it is, who has done most in the investigation of the subject, and in his work, Asie. Centrale, above often quoted, in his Cosmos, in his work on the Geographical distribution of plants, and other monographs and publications of his, much information may be obtained, also in Becquerelle's Elements de Physique; Thompson's Meteorology, Traill on Physical Geography &c.

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Chapter II

An Account of the Climate, and Indigenous Inhabitants of the Torrid Zone, with the ratio of mortality, sickness, and prevailing diseases.

The surface of our Globe, has been divided by Geographers into five Zones, in relation to its temperature, namely; one Torrid Zone, extending for 23½° on each side of the Equator; two Frigid Zones, which extend for 23½° round each Pole; and two Temperate Zones, which occupy the spaces between the Torrid and Frigid Zones.

I shall commence, by a short notice of the climate of the Torrid Zone, in so far as regards, the health of its inhabitants.

Section I. Remarks on the climate of the Torrid Zone.

This Zone, extending to 23½° on each side of the Equator, embraces, as may be seen on referring to the map, the greater part of Africa, a considerable portion of Asia, and the East India Islands, the principal part of South America, the West India Islands, a small part of North America, and most of the Islands in the Pacific. The inhabitants, have the sun vertical twice a year, and are, so, subject to a high temperature; they have also but two seasons, the dry, and

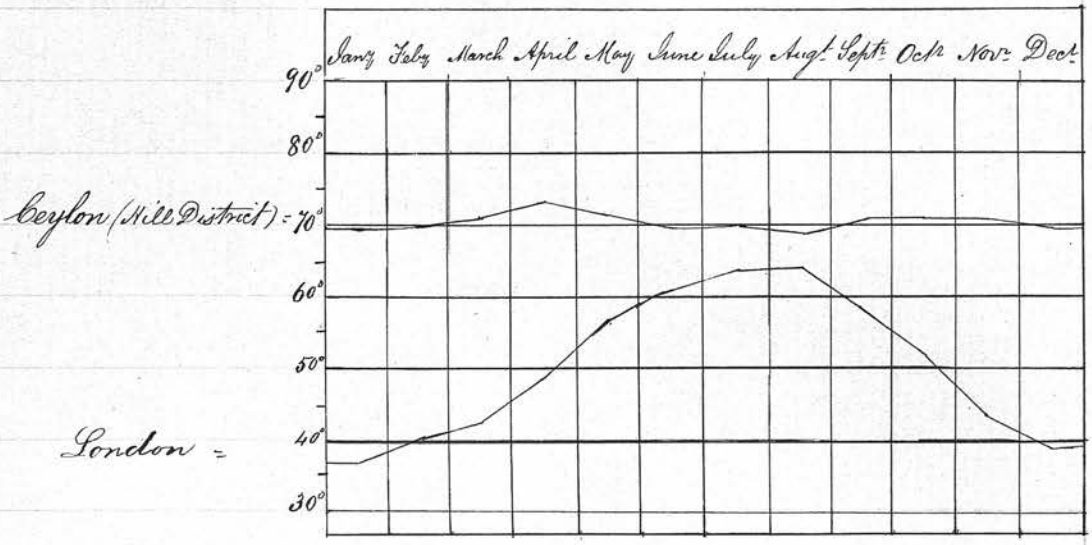
the rainy.

We have already, considered in a general manner, the climate of the Tropics, in the preceding observations, and add the following table to show the mean annual temperature of sixteen different Latitudes of this Zone.

Places.	Latitude	Mean Annual Temperature
Equator	0°	82½°
Meranham	2° 29' N.	81¼°
Batavia	6° 12' S.	80½°
Ceylon (Trincomalee	7° - N.	80½°
Cumana,	10° 27' N.	81½°
Pondicherry	11° 55' N.	85½°
Barbadoes	13° - N.	79¼°
Madras	13° 4' N.	80½°
Manilla	14° 3' N.	78°
Senegal	15° 5' N.	79½°
Vera Cruz.	18° 50' N	77½°
Bombay	18° 56' N.	80°
Macao	22° 12' N	74°
Rio Janeiro	22° 54' S.	74°3
Canton	23° 8' N.	73¼°
Savannah	23° 9' N.	78⅓°.

The above Table, shows no extreme regularity, in the diminution of temp-erature as we pass from the Equator, Pondicherry, in Ceylon, showing the highest degree of heat, a place could, however, be got under the Equator, which would exceed it, if we took them in equal circum-stances. From the Sun, not being at any time of the year, far removed from any particular place, the range of mean temper-ature is much limited, as will be shown by the following dia-

=gram, which exhibits the mean monthly temperature at Ceylon and the mean monthly temperature at London; the numbers from "Sir James Clarke on Climate".



The temperature of Ceylon, as shown in this diagram, serves very well as a type of that of the Torrid Zone, although many may vary more than that of Ceylon, as shown above. The mean annual temperature there is 70°18 and as may be seen 2½° Fahr. is the greatest variation, above the mean annual temp=erature, and 4° the variation of the whole year. Whilst the mean ~~annual~~ monthly temp=erature of London, as shown by the inferior line, exhibits considerable variation, the mean annual temperature being 50½°, the thermometer ranges 13° to either side, making the variation on the year 26°, while at Ceylon it is only 4°.

In some parts of the continents within the Torrid Zone, the thermo=meter occasionally reaches a great height. In Arabia it has been observed to stand at mid-day at 110°. At Sierra Leone it has risen to 138°. And Humboldt has seen it in many instances, as high as 118°, 120°, and 129°.

The temperature of the ocean in the Torrid Zone, is nearly that of the incumbent atmosphere. In the Carribbean Sea, Lat 15°. the temperature of the surface, is 83°. and in the Pacific Ocean. Lat 21°16', it is 79½°

We have seen that the amount of rain which falls in the Torrid Zone is large, while the number of rainy days ~~are~~ is small, and at particular seasons, called the Rainy seasons.

The prevailing winds have been already noticed. they are chiefly Constant as the Trade Winds, and the Monsoon. Other winds of a less innocent character are the Typhoon of the Chinese Seas. the Harmattan of the West Coast of Africa, the Hurricanes of the West Indies and Simoon or Samiel of the Desert.

Section II. The Indigenous Inhabitants of the Torrid Zone.

1 Tropical Africa. That portion of Africa, called tropical, extends from about the middle of the desert of Sahara, and the south of Egypt, to the land of the Hottentots, and is supposed to contain a population of about forty millions.

It is inhabited by the Ethiopian variety of the human race, characterized by dark skin, and eyes, black woolly hair, head compressed laterally, forehead low, narrow and slanting, a flat nose, thick lips, small chin, and the facial angle about 70°. As great a variety of features occurs among the Ethiopians, as among the Caucasians, and numerous tribes are distinguished from each other by a greater or less degree of difference.

The Negro is the most widely extended variety of the Ethiopian race, it occupies the centre of the continent and the west coast from Cape Verd, Lat. 15° N. to Cape Negro, Lat. 15° 50' S. they also extend to the east coast although not to any considerable amount. The Nubians and Abyssinians, on the east coast, are the same race, and have probably a mixture of Asiatic blood in them, they have long hair, tolerably regular features, and sometimes even handsome, as if the Caucasian, had got intermixed with them.

The Caffres another powerful division, occupy most of the east coast they are distinguished from the Negroes by having a high nose, convex forehead, and greater facial angle. The Caffres are a tall, stout, muscular race and often decidedly handsome. Besides these varieties we have many other smaller varieties as the Fallas, the Wanikas, the Monomoisy, the Chaga &c.

2 Tropical Asia. In tropical Asia, we find, the greater portion of the peninsula of Hindostan, the Burmese Empire, Siam, Cochin China, the peninsula of Malacca, part of China on the east, and of Arabia on the west, with the islands of Ceylon, Sumatra, Java, Borneo, New Guinea, the Philippines and northern part of New Holland &c.

The Mongolian and Malayan varieties, occupy the greater part of the places above mentioned. The Mongolian are characterized by an olive coloured complexion, flat nose, black, strong and straight hair, little or no beard, high cheek bones, receding forehead, head of a square form, facial angle 75°. The Chinese, belong to the Mongolian variety. The

Hindoos seem to be a mixed race, made up of aborigines, and those whose pursuits had brought them there. The Arabs are a branch of the Caucasian family. The peninsula of Malacca, the Burmese Empire, Siam, the islands of Sumatra, Java, Borneo, New Holland, and Polynesia &c. are inhabited by the Malay variety, which variety is characterized by the brown colour of skin, varying from an almost white colour, to a deep brown, thick black hair, head laterally compressed, nose broad, and mouth wide, with thick lips. Under this variety many races are included. The island of Papua or New Guinea, is inhabited by a race, probably derived from Africa, although some make a distinct race*

3 Tropical America. Here we find, the West India Islands, part of Mexico, the states of Colombia, Guiana, Brazil, Peru and Bolivia, and probably contain a population of between twenty and thirty millions. The aborigines of the West Indies are no longer in existence, but their place is supplied by imported Africans. The indigenous inhabitants of Tropical America would appear to be of the Malayan variety, nor is this improbable, as they easily could reach south America by Oceanica, over which the Malayans are the native inhabitants.

Section III On the ratio of Mortality among the Indigenous Inhabitants of the Torrid Zone, and the Prevailing Diseases &c.

It is a well known fact that the chance of life differs in different countries and Climates, and that in the warmer quarters of the Earth, the average length of life, is shorter than in the more tem-

* Prichard's Physical History of Man. Vol I page 117.

=perate Regions, and to illustrate this, the following tables may be com=
=pared. (from Quetelet on Man, and Hawkins' Medical Statistics.)

Table showing the annual mortality, among the inhabitants of different Countries in Europe, to which I have added the ratio per 1000.

Countries	Period of observation	Annual Ratio of Deaths.	Annual ratio of deaths per 1000
Russia		1 death in 26 inhabts	or 38·5 per 1000
Roman States	1829	1 " 28 "	" 35 " "
Spain		1 " 30 "	" 33·3 " "
Two Sicilies		1 " 31 "	32·2 " "
Wirtemberg		1 " 33 "	30·3 " "
Naples		1 " 34 "	29·3 " "
Prussia	1821 to 1824	1 " 39 "	25·6 " "
France & Holland	" "	1 " 40 "	" 25 " "
Austrian Empire	1825 to 1830	1 " 43	23·2
Sweden, Denmark and Germany		1 " 45 "	22·2 " "
Canton de Vaud	1824	1 " 47 "	" 21·3 " "
England	1821	1 " 51 "	" 19·6 "
Scotland	"	1 " 50	" 20· " "

Comparing the above table with the following, we find that the mortality increases, and consequently that the average duration of life diminishes. —

Table - showing the annual ratio of mortality which occurs in seven different Latitudes of the Torrid Zone.*

Places.	Latitudes	Annual ratio of Deaths.	ratio per 1000 -
Batavia	6° 10' S.	1 death to 26 inhabts	or 38·5 per 1000
Trinidad	10° 10' N.	1 " 27 "	" 37 " "
Saint Lucia	13° 54' N.	1 " 27 "	" 37 " "
Martinique	14° 44' N.	1 " 28 "	" 35 " "
Guadaloupe	15° 59' N	1 " 27 "	" 37 " "
Bombay	18° 36' N.	1 " 20	" 50 " "
Havannah	23° 11' N.	1 " 33	" 30·3 " "

* Prichard on the Physical History of Man. Vol I - 3rd Edit. page 118.

However in some of the instances given in the foregoing table, the rate of mortality appears greater than that, which properly belongs to the climate, some of the districts, including cities &c. known to be remarkably unhealthy. In some, the high mortality, is caused by Europeans, who suffer in great numbers in tropical climates, as will be afterwards seen: the natives of the countries having a much smaller ratio of mortality, than that shown by the generalization of the preceding table, indeed as the following table will show. the native Parsees, at Bombay, (which showed the highest mortality) suffering at about the average rate of Europe. *

Places.	Classes.	Ratio of mortality.
In Batavia 1805	Europeans died	1 in 11 or 91 per 1000
	Slaves —	1 " 13 - 77 — —
	Chinese —	1 - 29 - 34·5 — —
	Javanese, viz Natives	1 - 40 - 25 — —
In Bombay, 1815	Europeans died -	1 - 18·5 - 54 — —
	Mussulmans —	1 - 17·5 59 — —
	Parsees. natives	1 - 40 - 25 — —
In Guadaloupe, 1811-24	Whites	1 - 22·5 - 44·4 — —
	Free men of Colour	1 - 35 - 28·5 — —
In Martinique, 1825	Whites	1 - 24 - 41·6 — —
	Free men of colour	1 - 23 - 43·5 — —
In Grenada, 1815	Slaves	1 - 22 - 45·4 — —
In Saint Lucia 1802	Slaves	1 - 20 - 50 — —

We see by the above table that a very low degree of mortality, obtains among the natives or rather aborigines of those countries, as among the Javanese and Parsees, or among those races, who have become naturalized there by a residence of some generations, as the Free men of Colour of

the West Indies. It would appear, that they are become freed from those morbific agencies, which are so disastrous to Europeans, and other Strangers. It is difficult to explain, why the ratio of mortality among them, should be lower than among the natives of Southern Europe. We see also, by those Tables, that we ought not to conclude, that the rate of mortality is higher in tropical than in temperate countries, from observations, of the number of deaths, occurring among a few Europeans, residing, in a tropical climate, or even among the African in the West India Islands, for to both those races, we shall afterwards see that the climate in which they live, proves very deleterious; it would, in fact, require, that observations be deduced from extensive data, collected entirely, from among the indigenous inhabitants only. If we take the rate of mortality among the Javanese and Parsees, in countries, between 6° and 18° of Latitude, where they are either the original inhabitants, or have become naturalized by a residence of centuries, we find that it is as low as that of France and Holland, namely 1 death among 40 inhabitants, annually or 25 per 1000. We see also, thereby, that nature has adapted man, for the climate of any country, whose inhabitant, he was intended to be.

We have preceded with these general remarks, the more particular consideration of the rate of mortality of the Indigenous inhabitants of the Torrid Zone.

1 Ratio of mortality in Tropical Africa As might be expected, Statistics, which would enable us to estimate the ratio of mortality in

* Marshall, on the Pentateuch.

* Prichard on the Physical History of Man. Vol I. page 123.

Tropical Africa, are very scanty, and unadequate.

M. Virey, in his natural history of the Human race, says that the Negro, is in general more shortlived than the European. Dr Winterbottom, informs us that "few of the inhabitants of Guinea, arrive at old age, he says that "they turn old sooner than Europeans, and appear in a state of decrepitude, when the latter, have scarcely reached the grand climacteric." M. Adanson tells us that "the natives of Senegal are really old at the age of forty five, and sometimes earlier" and accounts of the same purport, are given by Bosman and others respecting the natives of Guinea and Congo.*

The shortness of life, mentioned by these authors, may be the result of circumstances. The fact of their being in the condition of Savages, with all its concomitant evil effects, may sufficiently account for that statement, for we have mentioned by these and other authors, instances of extreme longevity. Still, it is not by any such loose statements as the above, or by detached instances of men, who have attained an advanced old age, that the question of the rate of mortality is to be decided, for such cannot be compared with data from another country.

By the following statement of what takes place among the native troops, serving in Africa, we may form a more correct idea of the rate of mortality. The mean annual strength of the Black troops, employed, on the west coast of Africa, from fourteen years observation amounted to 469 and the annual ratio of mortality to 36

* Prichard on the Physical history of Man. Vol I page 158.

per 1000 or 1 death to 27 men. now the annual ratio of mortality among the troops in France is 20 per 1000, consequently we conclude that the Africans on the west coast of Africa, are shorter lived, than the natives of France, however the station of those African troops is remarkably unhealthy -

Again in the Island of Bourbon, (Lat 22° S.) M. Thomas, states, that, among the slave population, who are Africans, the annual ratio of mortality is 30 per 1000. although among the free blacks, there the mortality is not so great, being only about 16 per 1000.

Having now, as fully as we could, considered the ratio of mortality among the natives of Africa, we proceed, to enumerate a few of the prevailing diseases.

Prevalent Diseases in Tropical Africa.

1 Fevers. Dr Winterbottom informs us, that the native blacks of Sierra Leone, often have remittent and intermittent fevers, which run their course, precisely as they would do in Europeans, who by what is termed seasoning, have accommodated themselves to the climate, He adds that the same diseases, are very common among the negroes, who were brought from Nova Scotia, to live at Sierra Leone.* There can be no doubt, that they are much less liable to remittent fevers than Europeans. for there are medical men in the west Indies, who have witnessed few or no cases among the imported Africans.

2 Pectoral Diseases. On the continent of Africa, consumption,

* Mr Marshall on the Geographical Distribution of Diseases. Edinr Med. Journal
Vol XXXVIII page 339.

seems to be a rare disease. Dr Winterbottom says, in regard to consumption in the colony of Sierra Leone, that "as an idiopathic disease I do not recollect to have seen a single case": it would seem, however to be more common among the Foulahs and Mandingoes. and as we shall afterwards see, the natives of Africa are very liable to it in other climates.

3 Dysentery. This may be considered a tropical complaint, affecting Europeans, Africans, Singhalese, Malays, Gentoos, and Mussulmans indiscriminately* Dr Winterbottom says that the Negroes on the African coast, suffer greatly in unhealthy districts from dysenteries, diarrhaas, and other diseases which arise from local causes. Dr Lind says that the natives of Guinea, are not exempted from those diseases, fevers and fluxes, which attack strangers.

4 Diseases of the Brain, would seem to be uncommon among the natives of Africa. Mania is scarcely ever seen. There is however, a disease, accompanied with an extreme amount of stupor, which is very fatal

5 The Yaws. would seem to be indigenous in the west coast of Africa, whence it has been carried to the West Indies. This disease has been considered by some as peculiar to the Negroes in Africa, but well marked cases, have been described occuring among persons of European birth and descent.

6 Skin Diseases. These are by no means uncommon among the Negroes. Albinoes are relatively more numerous in Africa, than

* Edinburgh Medical & Surgical Journal Vol XXXVIII page 341.

in Asia or America; the King of Ashantee collected nearly 100 such. The Itch, according to Dr Schotte," is annually, during the rainy season at Senegal, endemic, among the Blacks but particularly among the Young ones" The disease yields to the external use of Sulphur, but the blacks seldom take anything for it as it Commonly dis=appears spontaneously after the rainy season is over"

7 Deformities of the body, would seem to be extremely rare, in tropical Africa -

2 Ratio of Mortality in Tropical Asia. The ordinary annual ratio of mortality among the inhabitants of India, may be inferred from the following statement of the population and deaths in two districts for one year to be about 14 per 1000 -*

	Population,	Deaths.	Ratio per 1000
Madura,	245.654.	3933.	15·95.
Dindigul	295.654,	3438.	11·63,
Total,	541.308,	7371	Mean - 13·78.

From the above table, we observe, that the annual ratio of mortality in those two provinces, is about 14 per 1000, or 1 death for every 72 inhabitants. This is an exceedingly low rate of mortality, being about 6 less than what occurs in England in the 1000, but I question very much whether it can be entirely correct, although founded on good authority. It differs in a great degree from what takes place in Calcutta, as

* Journal of the Statistical Society of London. Vol VIII page 53.

the following table may show. *

Population of Calcutta by census 1837		Deaths	per 1000
157,473. Hindoos,	The annual average of deaths for 11 years.	8,996, =	57.1
59,604. Mussulmans,	— — — — —	2,070, =	34.7

By this statement, the average mortality among the Hindoos, is increas=ed fourfold, and appears to be about three times, as much as, that of England, which is 19.6 per 1000. We see also that the mussul=mans, have a better chance of life than the Hindoos, the mortality among the former being 22 per 1000. less than among the latter. But very probably the last table, shows a too high mortality, for the whole of India, as the former table, did a too low one, and I am borne out in this opinion, by a statement of Colonel Sykes, which is, that in the Deccan, with a population of, above 3,000,000, the annual ratio of mortality was 1 in 37 or 27 deaths per 1000: which we may consider about the ratio of mortality for all ages in India, for although the troops, show a much lower degree of mortality, they do so also in Great Britain, being men in the prime of life, and when their chance is better,

We shall now see, what is the annual mortality among the Native troops in the different presidencies &c.

The following table extracted from the 39th volumn of the Edinburgh Medical and Surgical Journal, will show the mortality, which occured among the native troops of the Madras,

* Edinburgh Medical and Surgical Journal. Vol XXXIX

Presidency, during a period of four years, with the rate per 1000.*

Years.	Strength.	Deaths.	Annual ratio per 1000.
1827,	84,128.	1362,	16.
1828,	76,224,	1129	15.
1829,	71,945,	841	12,
1830,	67,106.	709	11,
Totals.	299,403,	4041.	
Mean of the 4 years	74,851.	1010	13·5.

This ratio of mortality however is exceeded, by that given to the same troops, by a paper in 4th volumn. of the London Statistical Society Journal, which states that it amounts to 16·13 per 1000. Still, we observe by those statements that the rate of mortality is about as low, among the population of India, as of England, judging by the proportion of deaths, among the native troops of either Country. Taking the average of the rate of mortality, ascribed to the native troops, by the above accounts, which is 14·8, we find that it is, about the same as that of the British troops in Britain, namely 15 per 1000. But, we shall require more statistics on the subject before we can speak with confidence -

The following table showing the rate of mortality annually, in the Pre= =sidencies of Bengal and Agra, among the native troops, will conform, the above statement, It is from a report by Mr Hutchison, on the Medical management of the native Jails throughout those Pre= =sidencies -

* Annesley on the diseases of India. 2nd Edit: Table XIV.

Stations.	Strength.	Deaths	Ratio per 1000. annually.
The Presidency,	1405,	82,	59:-
Barrackpore,	9649,	188,	19·6,
Berhampore,	5762,	76,	13·2,
Dinapore,	4280,	54,	12·6,
Benares,	5769,	40,	7. 7
Allahabad,	6000,	33,	5. 5,
Cawnpore,	12980,	98,	7. 7,
Meerut	12728,	80,	6·3,
Agra	5269,	40,	7·6,
Rutnawl,	7304,	58,	8·-
Sangur,	6367,	44,	6·9,
Nemuch,	13162,	162,	12·4,
Total	90,075,	935,	Mean 10·6

By this table we see that in Bengal and Agra, the ratio of mortality, in the year 1833. was 10·6 per 1000 or 1 death for every 94 men, which agrees very exactly, with the statement of Colonel Tulloch, which is, that the mortality of the native troops of Bengal, does not exceed 11 per 1000 annually. However these two Presidencies include some of the healthiest places in India, and some of the stations, indeed are rather beyond the Tropics. as Agra and Benares.

Mr Annesley, gives a return of the deaths, among the native troops, of the Madras Presidency, which shows a considerably greater degree of mortality, namely. Among 82,046 native troops, there were 1929 deaths, or in the ratio of 23 per 1000*, among that number of deaths, there were 830 from Cholera, which was epidemic in that year (1821)- and which if deducted, would lower the mortality to 14 per 1000 or thereby.

* Journal of the Statistical Society of London, Vol IV. page 146

In the Journal of the London Statistical Society, there are some tables showing the mortality among the troops of the Madras Presidency, serving at Penang, Singapore and Malacca, from which we have obtained the following table.

Table showing the Deaths, and ratio per 1000, which occurred among the Native Troops from Madras, stationed at Penang, Singapore, and Malacca, for ten years from 1829 to 1838.*

Years.	Strength	Deaths.	Ratio per 1000 annually.
1829	1,529	38	24·8
1830	1,953	27	13·8
1831	2,270	29	12·7
1832	3,011	87	28·8
1833	2,250	66	29·3
1834	1,690	46	27·2
1835	2,135	32	14·9
1836	1,699	26	15·8
1837	1,597	25	15·6
1838	1,807	24	13·2
Total.	19,941	400	Mean 20 per 1000.

This table shows a rather high mortality, but during the years 1832-33, the troops were engaged in the field, in Malacca, which caused an increase of mortality in the returns of those years. If these be deducted, the average number of deaths is reduced to 16·8 per 1000. which is very little higher than that of Madras, which is 16·13 per 1000.

* Journal of the Statistical Society of London. Vol IV. page 142.

The Island of Penang is situated in Latitude 5°20° N. Long 100°25 E.
Singapore — — — — 1°16' N. — 103°53 E.
Malacca extends from Latitude 1° N to Latitude 11° N.
We have also obtained from the same source, as the last table one, showing the mortality occuring among the native troops of Madras stationed at Moulmein on the Tenasserim Coast which extends from the 11th to the 17th degree of north Latitude.

Table, showing the deaths and ratio per 1000 of the mortality occurring among the Native Troops from Madras, stationed at Moulmein, during the years 1829 to 1838 inclusive *

Years	Strength	Deaths	Ratio per 1000 annually
1829,	1560,	15	9·6
1830,	1148,	27	23·5
1831,	1062,	11	10·3
1832,	1136,	11	9·6
1833,	1094,	11	10·-
1834,	996,	10	10·-
1835,	966,	9	9·3
1836,	967,	16	16·5
1837,	1008,	24	23·8
1838,	1625,	35	21·5
Total	11.362	169	Mean 14·6 per 1000.

This Table shows a mortality, as small as that of the Native troops in Britain, and somewhat lower than that of the

Native Troops at Madras.

From the two preceding tables, we have the following, showing the mortality caused among Natives, by the Climate of the Eastern Peninsula, in so far as we can obtain information,

Mean annual strength of troops, at Moulmein, Penang &c. during 10 Years.	Ratio of deaths per 1000, annually.
3,150	18·06.

From all the foregoing data, we may infer, that the climate of India, although injurious to the natives of temperate regions, is still, adapted for the indigenous inhabitants of the country, for we see that the mortality is about as low as that of England and even less than that of the average of Europe. And that the mortality among the natives of the Tropics, is by no means higher, than that, of the inhabitants of more Temperate regions.

We now proceed to the consideration of the most prevalent diseases among the inhabitants of Tropical Asia.

Prevalent Diseases in Tropical Asia.

1 Fevers. Fever would appear to be the most prevalent disease among the natives, as it is among the Europeans of India, as will be shown by the Table at page 54, the deaths from this cause amounting to 3·53 at Madras and 3·68 in the Eastern Peninsula per 1000, but at the latter place, the ratio is somewhat raised by the excess in

this class of diseases, which occurred during the employment of the troops, upon active service in Malacca, during the years 1832-33. In the other table at page 55, showing the ratio of mortality from the principal diseases, occuring among the Native Troops of the Madras Presidency from 1827 to 1830 inclusive, the rate of mortality from fever is much smaller being only 2·5 per 1000. Mr Annesley in his work on the Diseases of India, estimates the ratio of mortality among the native troops at the different stations, in 1821 at from 2 to 6 per 1000. He states that the Continued Fever is most common, during the hot season; and the Remittent and Intermittent Fevers, are most prevalent during the rainy season.

2 Pectoral Diseases. Mr Annesley says that affections of the respiratory organs, are seldom observed, in the southern provinces of India, but that in the more northern provinces, they are not unfrequent. The Table at page 55, shows us that they occur among the Madras native troops in the ratio of 0·6 per 1000 or 1 death in 1666 men. This is a small mortality, compared with that, occuring among the Troops in Scotland, where it is about 4½ deaths per 1000. Dr Clarke has stated that it is somewhat higher among the natives of Ceylon being about 1·2 per 1000.

3 Dysentery and Diseases of the bowels. Dysentery occurs with considerable frequency among the natives of India, among the troops in the Eastern Peninsula, the deaths from Dysentery, amount to 1·24 per 1000, and at Madras to 1 per 1000. Diarrhœa occurs very

frequently among the Natives of India. In the Eastern Peninsula, the deaths were at the rate of 2·25 per 1000. and at Madras ·86 per 1000, the mean being 1·55 per 1000. which is the same ratio as occurs from diarrhœa among the Europeans at Madras, although the latter suffer 12 times more severely from Dysentery. Cholera, unless during an epidemic, is by no means frequent or fatal among the natives.

4 Diseases of the Brain, are not frequent among the natives, and the mortality would appear to be only 0·2 per 1000 annually.

5 Ulcers and Abscesses would appear to be very common among the natives, and of an aggravated form, almost unknown among Europeans, causing death in the ratio of 0·38 per 1000 annually.

6 Rheumatism, would appear to be frequent among the natives, and to cause a higher mortality than among the European troops being about 1·14 per 1000 annually.

7 Hepatitis, although rare among the natives, is however of a fatal character, the deaths being nearly 1 in 6 of those attack=ed, and the ratio 0·15 per 1000 men annually.

8 Beriberi, says Mr Marshall "was very prevalent among the various clases of troops employed in Ceylon about the end of the last and commencement of the present century" "Since that period this disease has been com=paratively little known in Ceylon." It also affects the inhabitants of India, but is unknown, in any ~~in any~~ other quarter of the world. Its most prominent symptoms are "numbness. Odema, sometimes lofs

* Journal of the Statistical Society of London. Vol IV page 151.

of power of the lower extremities, general anasarca, dyspnœa, great uneasiness at the præcordia, spasms, feeble pulse, livid countenance and coldness of the extremities.

9 Skin Diseases Albinoes are not uncommon in India, and a few occur in Ceylon. Cacabay (leprosy of the joints) occurs frequently among the indigenous inhabitants of Ceylon and the peninsula of India. Tubercular Leprosy, occurs among the indigenous inhabitants of India and oriental Islands, but not so frequently as Cacabay, with which it is often confounded.

10 Intestinal Worms. The Ascaris lumbricoides, is much more frequent among the inhabitants of India, than those of temperate climates.

11 Elephant leg. This disease is common in Ceylon, from a place in which "Gallé" it takes one of its name, the only other locality is Barbadoes.

Table of the mortality among the Native Troops at Madras and the Eastern Peninsula, with the principal diseases, during 10 years.*

Diseases	Madras	Eastern Peninsula	Mean Ratio per 1000, annually.
Fever,	3·53	3·68	3·65
Hepatitis,	·11	·20	·155
Diarrhœa,	·86	2·25	1·535
Dysentery,	1·—	1·24	1·12
Cholera,	4·04	·06	2·05
Rheumatism	·80	1·49	1·145
Syphilis &c.	·16	·19	·175
Ulcers,	·37	·38	·375
Ophthalmia,	·02	·03	·025
Other Diseases,	5·24	8·54	6·89
Total	16·13	18·06	17·095

Table, showing the number of deaths, the ratio of mortality per 1000, and the principal Diseases occuring among the Native troops in the Madras Presidency, annually, on an average of 4 years from 1827 to 1830 inclusive, the average annual strength = 74,850. *

Diseases.	Deaths in 4 years.	Annual ratio per 1000.
Fevers.	745	2·5
Rheumatism,	239	0·8
Pectoral complaints,	184	0·6
Diseases of Liver,	29	0·1
Diseases of Bowels,	495	1·1
Cholera Morbus,	990	3·3
Diseases of Brain,	71	0·2
Dropsies,	232	0·8
Injuries and Ulcers,	248	0·9
Other Diseases.	808	2·7
Total	4041	13·5

Having considered the ratio of mortality among the indigenous inhabitants of India &c. we now proceed to consider an interesting & important part of the subject - namely, the Ratio of Sickness among the inhabitants of Tropical Asia, before proceeding to Tropical America -

Ratio of Sickness among the natives of Tropical Asia -

The information, which I have been able to obtain on this subject, relates,

only to the Native Troops, being able to find none, showing the ratio of sickness among all ages in India. But in practical importance, they are very important, as tables, by which we may compare, the rate of sickness of the Natives with that of Europeans.

From the paper in the 39th Vol of the Edinburgh Med. and Surg. Journal, before mentioned, I have constructed the following table

Table. Showing the mean strength of the Madras Native Troops, during the year 1827-28-29-30., the number of Admissions into Hospital, the ratio of Admissions per 1000 men, and the number of deaths, annually, together with the ratio of deaths per 1000 admissions.

Years.	Strength.	Admissions.	Ratio of admissions per 1000.	Deaths.	Rate of deaths per 1000 admitted.
1827.	84,128.	53,221.	632.	1362.	26·1
1828.	76,224.	40,848.	536.	1129.	27·6
1829.	71,945	32,982.	458.	841.	26·-
1830.	67,106	30,745.	450.	709.	23·1
Total-	299,403.	157,796		4041.	
Mean of 4 Years.	74,850	39,449	519	1010	26·1.

By this table we see that, on an average strength for four years, of 74,850 men, there were 39,449 admissions into hospital, annually or 519 per 1000 men. so that the native soldier in the Madras army, would appear to be liable to an attack of disease, only once in two years, or that one half of the Army pass through hospital in the course of the year. The latter part of the

table, shows the severity of the diseases, on the average of the year, thus in 1828, the ratio of deaths per 1000 of invalids was 27.6 or 1 death in 36 cases treated, this was the highest mortality; again in 1830, the ratio of deaths was 23.1 per 1000 patients, or 1 death in 43 cases treated. this was the lowest mortality, and on the average of the four years, the ratio of deaths per 1000 of admissions was 26.1, which corresponds to 1 death in 39 cases treated.

The Report of the Statistical Society of London, on the Sickness and Mortality among the Troops serving in the Madras Presidency, gives a somewhat higher rate of admissions to Hospital per 1000 men, among the Native Troops at Madras. namely 615 per 1000.

The following is intended to illustrate the sickness in the Eastern Peninsula, from Journal of Statistical Society of London Vol IV.

Table showing the mean strength of the Native Troops, in the Eastern Peninsula, with the number of admissions into hospital, and deaths and the ratio thereof to the mean strength, for 10 years.

Years.	Strength.	Admissions.	Deaths	Ratio per 1000 of mean Strength Admissions.	Deaths.
1829	3089	3655	53	1184	17.2
1830	3101	3362	54	1099	18.6
1831	3332	3267	40	1004	11.5
1832	4147	5839	98	1212	19.2
1833	3344	3236	77	914	19.6
1834	2686	2232	56	780	18.6
1835	3101	2357	41	702	12.1
1836	2666	1790	42	684	16.1
1837	2605	1606	49	604	19.7
1838.	3432	2058	59	602	17.3.
Total	31,503	29,402	569	"	"
Average	3,150	2940	56.9	906	17.3.

By this table, we see that the number of admissions to the hospital, was considerably higher, in the Eastern Peninsula, than at Madras, and the deaths somewhat lower.

The following table contains a comparative statement of the sick=ness among the Native troops at Madras and the Eastern Penin=sula, annually, distinguishing the principal diseases, together with the ratio of mortality per 1000, as shown by an average of 10 years from 1829 to 1838 inclusive -

Diseases.	Annual ratio of Admissions per 1000 of mean Strength		Annual ratio of deaths per 1000 of mean strength	
	Madras.	Eastern Peninsula,	Madras.	Eastn Peninsula
Fever,	189.-	298	3.53	3.68
Hepatitis,	.9	1.6	.11	.2
Diarrhœa,	16.-	42.-	.86	2.25
Dysentery,	9.6	20.-	1.—	1.24
Cholera,	9.-	.4	4.04	.06
Rheumatism,	53.-	87.-	.80	1.49
Syphilis &c.	23.-	38.—	.16	.19
Ulcers,	42.-	105.—	.37	.38
Ophthalmia,	11.—	10.—	.02	.03
Other Diseases	261.5	331.-	5.24	8.54
Total	615.-	933.-	16.13	18.06

These statements will afford to convey some idea, of the severity of the diseases and their number, among the troops of India. There yet remains another consideration, in connection with this division, namely the number of mean sick, or those unable for their duty.

From the report of Mr Hutchison, on the jails of Bengal & Agra we have obtained the following table, showing the number daily in hospital, among the native troops of those Presidencies -

Table showing the mean Strength and the mean number of sick with their ratio per 1000, at the different stations in the Presidencies of Bengal & Agra.

Stations	Strength,	Mean sick	Ratio per 1000,
Presidency,	1405	144	103
Barackpore,	9649	814	84
Berhampore,	5762	290	50
Dinapore,	4280	187	43
Benares,	5169	263	50
Allahabad,	6000	284	47
Cawnpore,	12980	488	37
Meerut,	12728	466	36
Agra,	5269	182	34
Kurnaul,	7304	225	30
Sangur	6367	329	51
Neemuch	13162	566,	43
Total	90075	4238	Mean 47

The table shows us that there is a great difference, in the number, of mean sick, at the different stations reaching at the Presidency to 103 per 1000 men, whilst at Kurnaul it is as low as 30 per 1000. Nor does the rate of mean sick, bear any proportion, to the rate of mort=ality, as may be seen, by comparing the above Table with the Table of the Mortality at those Stations at page 48.

We now proceed to examine, the rate of mortality and sickness, of America within the Tropics-

3 Ratio of Mortality in Tropical America. Dr. Prichard informs us, on the authority of several accurate observers, that the natives of South America, and Mexico, attain to a good

old age, it being not uncommon among them to attain to the age of a hundred years. and with little of that decay which time produces in the hair, teeth, skin, and muscles of the body. Humboldt makes the same observations respecting the Mexican and Peruvian Indians, and states that they retain their strength to the last.

Humboldt gives to one district in New Spain, an annual ratio of mortality of 1 to 26 or 38.5 per 1000. but on the whole country the deaths were 1 to 30 inhabitants annually. or 33 deaths per 1000. which is about the ratio of mortality for the South of Europe.

In the British colonies in the West Indies, the annual ratio of mort=
=ality, occurring among the slave population, may be seen by the following statement of Colonel Tulloch's. London Statistical Journal Vol I.

Annual ratio of mortality, per 1000 among the slave population of all ages. in the following Colonies -

British Guiana.	Trinidad	Tobago.	Grenada.	St Vincents	Barbadoes.	St Lucia.	Dominica.	Antigua St Kitts
34.-	30.-	47.-	36.-	34.-	31.-	35.-	35.-	30.-

From this table we learn that the highest ratio of mortality, occuring annually among the slave population of those colonies, occurs in the Island of Tobago, where it is 47 per 1000 or 1 death to every 21 individuals, and the lowest in Trinidad, Antigua and St Kitts, where it is 30 per 1000. or 1 death to every 33 individuals. the Average mortality on the whole, being about 35 per 1000 annually or 1 death to every 28.5 individuals of the population. This ratio is much higher than

that of the Natives of Great Britain, but it is not to be attributed to any severe treatment which the slave may receive, for we shall presently see, that the mortality among the black troops, who are on an equal footing with the British Soldier, is much higher, than among the slaves, although the troops are all selected men, and in the prime of life, while the slave returns, on which the preceding estimate is founded, embraces all classes, infants and aged, sick and healthy.

Table Annual Ratio of mortality per 1000, occurring among the black troops, serving in each of the following Colonies.

British Guiana,	Trinidad,	Tobago,	Grenada,	St Vincents,	Barbadoes,	St Lucia,	Dominica	Antigua,	St Kitts	Jamaica,	Bahamas,	Honduras,	Mean ratio per 1000 Annually.
40·,	39·7,	34·2	28·4,	36·2	46·	42·7	39·9	28·9	46·3	30,	41,	30.	37·9

By this table also, we see, that the mortality varies much in the different localities, from St Kitts and Barbadoes, where it is highest namely 46· per 1000 to that of Grenada where it is 28·4, while the average is 37·9 per 1000, or 1 death out of every 26 individuals.

Mr Marshall estimates the annual mortality of the African troops employed in the Windward and Leeward Islands, during a period of 19 years, much higher than any of the above rates, namely, at 55 per 1000.

Mr Balfour of the Madras army in calculating the ratio of deaths

* Journal of London Statistical Society. Vol VIII page 196

among
~~of~~ troops natives of Africa, serving in the West Indies, assigns them an annual mortality of 40 or 41 per 1000, as will be shown by the following table, which from its showing at one glance the average rate of mortality among natives of the tropics not serving in their own country, I insert here, although not strictly its own place

Table Average annual mortality per 1000 of Imperial Troops (natives of the Tropics) when in Foreign Countries (within the Tropics) *

	Annual Mortality per 1000
Madras native troops, gun Lascars & Pioneers, serving in the Tenasserim provinces from 1829 to 1836	12.-
Ceylon gun Lascars, natives of Madras & Bengal, serving in Colombo	13.-
First Ceylon Regiment of Malays, from Java, Penang, Malacca, and Singapore	25.-
Negro troops, military labourers, in Jamaica from 1817 to 1836	30.-
Ditto Ditto in Honduras. Ditto	30.-
Ditto. Black Pioneers of mixed origin, born in the Mauritius, partly, and in part brought from Madagascar, Mozambique, 1825-1836	37.2
Negro troops, brought from Africa, serving in Windward and Leeward Command from 1817-36	40.-
Negro troops, brought from Africa, serving in Bahamas, 1817 to 1836	41.-
Ceylon pioneer corps, natives of Madras & Bengal, from 1821 to 1833, serving among the passes and forests of Ceylon, and greatly exposed	43.-
Negro troops, serving in Ceylon, brought from Goa & Mozambique.	61.-
Mean Annual Mortality in Foreign Countries.	33.2

Comparison with the following table, from the same paper as the last, will show, very well, how much better suited, the climate of their native county is for the inhabitants of the Tropics.

Table Average Annual mortality per 1000 of troops, natives of the Tropics, serving in their native countries.

	Annual Mortality per 1000.
Hottentot Corps, aborigines of Southern Africa.	12.5
Bengal Army, natives chiefly of the Northern Provinces	13.-
Madras Army, natives chiefly of the Peninsula of India,	15.-
Ceylon armed Lascareyns, natives chiefly of Ceylon, from 1821 to 1835	25.8.
Average Annual Mortality in their native countries.	16.6

Prevalent Diseases in Tropical America.-

Mr. Prichard says that, "the native tribes of America, are subject according to Dr. Rush and others to remittent and intermittent fevers, dysenteries, and other diseases analogous to those which attack Europeans, under similar circumstances." Yellow fever according to Baron Humboldt, appears to have been known in America, before the arrival of Europeans. This appears to have been the pestilence, which was termed matlazahuatl, and which ravaged the empire of the Aztecas, before the arrival of Cortes and the Spaniards.

I shall begin the consideration of the prevalent diseases of the West Indies &c. by transcribing from the London Statistical Journal Vol I. the follow-

=ing table, which shows the annual ratio of mortality among the Negro Soldiers employed throughout the West Indies and the principal diseases by which it is caused.

Diseases.	Annual ratio of Mortality per 1000 of the Black troops & Pioneers serving in each of the following Colonies -												
	British Guiana	Trinidad -	Tobago -	Grenada -	St. Vincents -	Barbadoes -	St. Lucia -	Dominica	Antigua &c.	St. Kitts &c.	Jamaica -	Bahamas -	Honduras -
Fevers.	8·5	3·2	8·6	4·8	·9	3·8	5·2	7·7	1·7	10·5	8·2	5·6	4·4
Eruptive Fevers. (small pox &c)	-	7·-	-	-	1·8	·2	5·4	·4	·3	-	·5	1·7	-
Diseases of Lungs.	17·9	16·4	12·-	9·5	13·-	18·7	14·8	16·7	16·8	23·9	10·3	9·7	8·1
" " Liver.	·3	·8	1·-	1·-	-	·9	·9	1·6	1·7	·7	·4	·1	·8
" " Stomach & Bowels.	5·8	5·5	4·8	4·2	11·2	12·1	7·1	7·4	3·6	6·3	3·-	6·5	2·8
Cholera Morbus.	-	-	-	-	-	-	-	-	-	-	-	-	3·-
Diseases of Brain.	3·3	2·8	2·-	4·2	2·8	1·9	2·4	·4	1·4	1·4	·6	1·9	1·4
Dropsies.	2·4	1·1	4·3	2·1	2·8	3·1	2·6	1·2	·9	·7	3·-	2·6	1·6
All other Diseases.	2·4	2·9	1·5	2·6	3·7	5·3	4·3	4·5	2·5	2·8	4·-	12·9	7·9
Total	40·6	39·7	34·2	28·4	36·2	46·-	42·7	39·9	28·9	46·3	30·-	41·-	30·-

1 Fevers. From this Table, it appears that fevers, particularly those of the re=
=mittent and intermittent types, which are so fatal, as we shall see to the white troops, are much less so, to the Negroes, although it would ap=
=pear from the above, that they are not & exempt from the bane=
=ful influence of fever, an immunity which some have ascribed

* Prichard's Physical history of man Vol I page 159

to Negroes as a specific character. "D" Clark of Dominica in de=
=scribing the yellow fever, which prevailed in that island in 1793-6,
observes, that the New Negroes, who had lately been imported from
the coast of Africa, were all attacked by it. The Negroes who
had been long in the town, or on the island escaped."* En=
=demic fever prevails to a much greater degree in the West, than in
the East Indies. Eruptive fevers, especially small pox, are very
fatal to the Negroes of the West Indies, as two died out of every
seven attacked.

2 Diseases of the Lungs. as may be seen by the preceding table the
Negro troops suffer to a great extent, from this class of diseases.
in some cases, fully one half, of the deaths being from this cause.

The fatal influence of this class of diseases among negro troops, is
not confined to the West Indies alone, it extends to every climate
in which they have been employed; thus inducing the sup=
=position, that there must be in the constitution of the Negro,
some peculiarity, which predisposes him to affections of the lungs.
Upwards of two fifths of all the deaths among these troops have
arisen from this class of diseases, and more have died annual=
=ly by it alone in this Command, than among the same
number of troops in the United Kingdom by all diseases to=
=gether, a sufficient evidence, how unsuited the climate of
the West Indies is for the Negro Constitution.

Sir James Clarke says that in every thousand deaths among

the whites, chiefly if not almost wholly natives of Europe, one hundred and twenty, arise from pulmonic diseases, while in every thousand deaths among the Blacks, four hundred and seventy two, are attributed to the same cause. Mr Marshall tells us that in Ceylon, where the mean temperature of the coast, is 81° or 82° Fah. four-fifths if not nine tenths of the mortality of Africans is occasioned by pectoral disease, and chiefly by tubercular consumption. And yet we have seen that it is a rare disease in their native country, Dr Winterbottom saying that "as an idiopathic disease I do not recollect to have seen a single case."

3 Diseases of the Bowels. From the preceding table we see that the negro troops suffer to a considerable extent from diseases of the stomach and bowels, and to a greater extent from epidemic cholera, than the white troops.

4 Diseases of the Brain. From the preceding table, it would appear that a very considerable amount of mortality, takes place among the Negroes in the West Indies from this class of disorders, assisted no doubt by habits not of the most temperate description.

5 Cacabay affects many negroes in the West Indies, as in Jamaica, according to Dr Hunter, and in Barbadoes, Hillary asserts that it affects both negroes and creole whites.

6. Filaria Medinensis. Guinea Worm, is a disease of con-

* Mr. Marshall in 38th Vol of Edinr. Med & Surg. Journal.

=siderable moment in some of the West India Islands. So prevalent in some seasons is it, that 300 out of 500 negroes, have been laid up with it, at the same time, in one of the Grenadines, and in Grenada it often happens that 50 negroes out of 300 are in the sick list, on account of it *

7 Tetanus, Trismus. In the settlements of Demerara and Esseguibo, according to Dr. Hancock, on half of the new born children die of tetanus.

We shall now see what is the ratio of sickness among the natives of the West Indies. or rather among the troops, having been able to obtain no data, for that of any other Inhabitants.

Ratio of Sickness among the Black troops of the West Indies.

It might at first be supposed, that, in a country where the mort=ality is so large as in the West Indies, there would be a pro=portional number continually on the sick list, but this is not the case, the diseases there, terminating in most instances rapidly, either in death or recovery - and not detaining the patient long in hospital. This is more especially the case, as we shall hereafter see, among the European troops.

In the Windward and Leeward Command, the average sick time of each black soldier per annum is 15 days. and the average duration of each attack of sickness is 19 days. so that the negro soldier may expect to be in

Hospital for 19 days every fifteen months.

We have now considered, in a sufficiently minute manner, the Climate of the Torrid Zone, its effects on the indigenous inhabitants of that Zone as regards their health and mortality, and noticed some of the principal diseases. and shall now proceed to a like consideration of the Temperate Zones.

Chapter III.

An Account of the Climate of the Temperate Zones, the Indigenous Inhabitants, Mortality and Prevailing diseases.

Section I. Remarks on the climate of the Northern Temperate Zone.

This Zone extends from Latitude 23½° N. to Latitude 66½ N. and embraces a much larger proportion of land than the Temperate Zone of the Southern Hemisphere.

As may be seen by referring to the map it embraces, a large part of Africa, the most of Asia, nearly all Europe, and

North America. The Inhabitants have the Sun always to the South, and so have their year divided into four seasons, of different durations and intensities, in the different places, namely Spring, Summer, Autumn and Winter.

We have already in the first chapter, considered generally, the climate of this Zone, and found that Europe has on the whole an equable climate, while Asia and America are more of the character of Excessive.

The following table, shows the mean annual temperature in several latitudes of the North Temperate Zone, with mean temperature of coldest and of warmest months,

Places	Latitude	Mean temperature Of the Year.	Of warmest month.	Of Coldest month
Santa Cruz (Canaries.)	28° N.	70°94	78·89	63·84
Cairo.	30° –	72°17	85·82	58·10
Funchal	32°30′ –	64°96	71·88	59·71
Cadiz.	36°30′ –	62°88	72·86	51·40
St. Michaels (Azores)	37°40′	62°40	70· —	59· –
Corfu	39°30′	65°55	81·28	52·57
Rome	41°52′	60°7	74·02	44·92
Nice	43°20′	59°48	74·3 –	45·85
Milan	45°28′	55°–	74·66	36·14
Paris	48°50′	51°5	65·7	36·14
Brussels	50°50′	57°	67·28	35·6
London	51°30′	50°39	63·52	37·36
Dublin	53°21′	49°10	61·16	35·42
St Petersburgh	59° –	38° –	65·66	8·10
Edinburgh	55°57′	47°31	59·31	40·17
Moscow	55°45′	40° –	70·52	6·08

This table shows a pretty regular diminution of mean temper=ature as we increase the Latitude, except in those places, which

are situated much inland as Moscow. which has a summer as warm as the Azores. and a winter much below the freezing point.

The following table shows the mean annual temperature of several places in America with the mean temperature of the warmest & coldest months -

Places	Latitude	Mean Temperature of the Year	Of warmest month,	Of coldest mo.
Bermuda	32° - N.	73°.5	79.75	63.-
Cincinnati	39°6' N	53°.78	74.30	30.2
Philadelphia,	39°56' -	53°.42	77.-	32.72
New York	40°46' -	53°.78	80.78	25.34
Quebec,	46°47' -	41.74	73.40	13.18

The other subjects connected with the climate of this Zone. have been already considered in Chapter I as the fall of rain, prevailing winds &c.

Section II Indigenous Inhabitants of the North Temperate Zone.-

1 The extent of Europe is about 3.000.000 square miles. and it contains a population of about 230.000.000. It is inhabited by the Caucasian variety of the human family. which is characterized by white or fair skin, brownish hair. some-

=times black, abundant and soft. - head of a square form, front teeth of both jaws perpendicular. chin full and rounded, and the facial angle about 80°.

Europe has for the last two or three thousand years, been inhabited by three principal races, divisions of the Caucasian variety, and distinguishable from each other by marked characters, they are the Celtic, Saxon, or German, and Sclavonic Races.

The Celtic Race, occupies the greater part of the West and South of Europe, being the race of the inhabitants of Ireland, the Highlands of Scotland, France, Spain, Portugal, and part of Italy. The earlier inhabitants of England and of the Lowlands of Scotland were Celts, but are now so much changed that they may be included under the next race.

The Saxon or German race, occupies the central part of Europe, and includes the modern Germans, Danes, Swedes, English, Lowland Scotch &c. This race is essentially fair, with blue eyes.

The Sclavonic Race, occupies the eastern parts of Europe, embracing the Russians, Poles, Hungarians, &c.

The Turks are of the Caucasian Variety and come from Asia. In the extreme north of Europe, we have some races of the Mongolian variety, namely the Laplanders & Samoiedes.

2 Asia within the Temperate Zone. On the Western side of Asia, the Caucasian variety prevails. indeed it comes from that Quarter. Belonging to this variety we have the

Georgians, Circassians, Persians, Armenians, Turks, Chaldeans and other minor tribes - The middle, northern and eastern parts of Asia are occupied by the Mongolian variety, already described*. In the middle we have the Tartars, or Tribes of Chinese and Independent Tartary, who lead a wandering and pastoral life, In the east are the Chinese and in the north, Siberians &c.

3 Africa within the Temperate Zone, is inhabited by Moors & Egyptians, who belong to the Caucasian Variety.

4 America within the Temperate Zone, The Aboriginal inhabitants of this part of America, are the North American variety or Indians, characterized by the bronze colour, receding forehead & little or no beard. But we may say that the Caucasian variety is now indigenous there, where they have been long resident and flourish.

Section III On the Ratio of mortality among the Indigenous Inhabitants of the Northern Temperate Zone, with remarks on some of the prevailing Diseases.

1 Ratio of Mortality in Europe, Within the limits of Europe a great diversity of mortality to the number of the inhabitants of the different countries exists, and in the countries in the highest degree of civilization, the chance of life is greater, in the same manner, as we know that with the improvements of modern

science and government's sanitory laws. the chance of life has improved in this country as well as elsewhere.

The following table which was inserted at page 39, we now repeat to show the annual rate of mortality in several of the countries of Europe.

Table. Showing the annual mortality and ratio per 1000. among the inhabitants of the undermentioned Countries of Europe.

Countries	Period of Observation	annual ratio of Deaths.	annual ratio of deaths per 1000
Russia		1 death in 26 inhabitants.	38.5 per 1000
Roman States.	1829	1 — — 28 —	35. — — —
Spain		1 — — 30 —	33.3 — —
Two Sicilies		1 — — 31 —	32.2 — —
Wirtemberg		1 — — 33 —	30.3 — —
Naples.		1 — — 34	29.3 — —
Prussia	1821 to 1824	1 — — 39	25.6 — —
France & Holland		1 — — 40	25. — — —
Austrian Empire	1825 to 1830.	1 — — 43	23.2 — —
Sweden, Denmark and Germany		1 — — 45	22.2
Canton de Vaud	1824	1 — 47	21.3 — —
Britain	1821	1 — 50	20. — — —

By this table we see that Britain enjoys a lower ratio of mortality than any other country in Europe. Russia very nearly doubles in its mortality that of England, while Switzerland, Sweden. Denmark and Germany would seem to come next to Britain in a low rate of mortality.

The above table includes in its calculation, the deaths occurring among the inhabitants of the country, as well as of the town, and as we might expect, we shall find that the mortality of

the population of cities exceeds that of the rural districts, as the following table will exhibit when compared with the last, Table showing the annual ratio of deaths and ratio per 1000, among the inhabitants of the following cities of Europe -

Cities	Ratio of Deaths annually.	Annual ratio of Mortality per 1000.
Vienna	1 death to 22 inhabts	45·4 per 1000
Rome	1 — — 25 —	40· — — —
Cadiz	1 — — 25·	40 — — —
Brussels	1 — — 25 —	40 — — —
Madrid	1 — — 29	34·5 — —
Edinburgh	1 — — 30	33·3 — —
Paris	1 — — 32	31· — —
Liverpool	1 — — 32	31 — —
Manchester	1 — — 33	30·3 — —
London	1 — — 36	27·7 — —

This table shows us that the mortality of the towns is considerably greater than the whole country. consequently it must be much higher than among the rural population. Compare also the mortality of London 1 death to 36 individuals, with the ratio occur=ring in Herefordshire 1 death to 63·53, in Devonshire 1 death to 57·76. Hampshire 1 death to 55·36. and in Cornwall 1 death to 58·54 individuals annually. all agricultural counties.

A General comparison of the statistics of Central Europe gives the following average results

In villages	1 death to	40 inhabitants
— Towns	1 — —	30 — —
— Large Capitals	1 — —	25 — —

In England. the ratio of mortality has been gradually decreasing.

for the last 70 years. as we see by the calculations of deaths per 1000. from the returns obtained by the population act. In 1780 the deaths were 1 to 40 inhabitants or 25 per 1000. now they are just at the rate ~~of~~ namely 1 to 50 inhabitants or 20 per 1000. —

Most of our statistics in the preceding part of this essay, have been taken from the Military returns, and these possess an accuracy that cannot be obtained, in the statistics of the whole inhabitants of a country. Moreover, we can, by them better compare, the influence which climate exercises on the health and mortality of men. They are all about the same age, have the same food, and exercise, in one place as in another, and if the mortality among the soldiers of different countries, varies, we may conclude that the mortality among the persons in Civil life there varies proportionally. Although it might be supposed, from the circumstances of troops in the time of peace, having good food and lodgings, being carefully selected and attended to, and having no particular hardships to endure, that the mortality among them would be less, than among the great mass of the labouring population of an equal age, yet we find that not to be the case. The average age of Soldiers, in this Country is from 29 to 30 years. By the Carlisle tables, the number annually dying out of 1000 persons at that age, would be about 10. or by Mr. Finlayson's observations, the number would be 13., taking the mean, we have 11·5 per 1000 dying annually at the age of 29 to 30 years. Now among the military in this

country the ratio of deaths is about 15·3 per 1000. or one third higher, than among the civil population of the whole country. On the other hand, we may say that being the inhabitants of large towns, they Labour under the evils. concomitant with the insalubrious positions of such districts, and when the ratio of deaths annually at the age of 30, occuring among the inhabit=ants of large towns, is compared with that occuring among the troops, we find them about the same. -

The mortality in the Prussian army, on an average of ten years, from 1821 to 1830 was 11·7 per 1000 annually, but that army is composed of men between 20 and 25 years, whilst ours is as we have seen, considerably above that age. The mortality in the French army on an average of six years, from 1820 to 1826 was 19·5 per 1000 annually. Among the Malta Fencibles, composed of natives of that island, the average mortality does not exceed 9 per 1000 annually. The mortality in the British Navy on the Med=iterranean Station, on an average of Seven years from 1830 to 1836 was 9·3 per 1000 annually, and among the Military, on the same station, during the same period it was 18 per 1000 annually. To all those, who are conversant with the subject of Vital Statistics it is well Known that age forms a most important element, in the consideration of mortality, as above the age of 18 years, we shall see by the following table, the mortality among the troops in the United Kingdom, rapidly increases with the

* Journal of London Statistical Society Vol II Page 258.

advancing age, and this in an economical point of view would indicate the propriety, of making the period of service among the soldiers as short as possible.

Table showing the aggregate strength and total deaths, at each age in returns of 7 years, and the Annual ratio of deaths per 1000 living at each age.*

Ages	Aggregate Strength at each age in returns of 7 Years.	Total Deaths at each age in returns of 7 Years.	Annual ratio of Deaths per 1000 Living at each age.
Under 18	455.	2	4·4
18 to 25	15,320.	213	13·9
25 to 33	15,919.	222	14·-
33 to 40	8,549.	148	17·3
Above 40	2,920	78	26·7
Total	43,163	663	15·3

I shall now proceed to make a few observations on the Prevalent Diseases

Prevalent Diseases of Europe.

Considerable difficulty, has always attended, the calculation of the ratio of deaths by each disease, among the population of a country. The following table is obtained from the first annual report of the Registrar General on the Births, Deaths, and Marriages in England 1837-1838. In that report by Mr Farr, it appears.

* Journal of London Statistical Society Vol II. page 271.

that, in the half year ending 31st December 1837. the causes of death were assigned in 141.607 instances. The following table is an abstract of this information, the diseases being grouped together in a few classes, according to their character.*

Classes of Diseases	Total number of deaths	Per-centage proportion of deaths
Epidemic, Endemic and Contagious Sporadic. viz	32.537	22·977
Diseases of Nervous System,	21.852	15·431
—— Respiratory Organs	38.522	27·203
—— Organs of Circulation	1.596	1·127
—— Digestive Organs,	9.850	6·956
—— Urinary Organs.	816	·576
—— Organs of Generation,	1.498	1·058
—— Organs of Locomotion,	929	·656
—— Integument	264	·187
Of Uncertain Seat	16.207	11·445
Old Age	12.691	8·962
Violent Deaths	4.845	3·422
Total	141.607	100·—

With respect to the principal diseases of the first class. it appears that 2.520 persons died of scarlatina, 3.044 of Hooping cough, 4.732 of measles, and 5.811 of Smallpox. The proportional percentage of deaths by Small pox, Typhus, and Phthysis was, Smallpox 4·104, Typhus 6·389 and Phthysis 19·599,

The following table shows the ratio per 1000 of attacks of disease and the deaths therefrom, which occurred among the Naval and Military Forces, serving on the Mediterranean Station

Diseases	Naval Force		Military Force	
	Ratio per 1000 of mean Strength			
	Attacked	Deaths	Attacked	Deaths
Fevers	84	1·5	211	3·7
Eruptive Fevers	7	·14	1	·05
Diseases of the Lungs	243	3·2	144	6·5
— — — Liver	10	·3	16	·6
— — — Stomach &c	155	·9	188	2·5
Epidemic Cholera	2	·4	7	2·1
Diseases of the Brain	17	·9	11	1·1
Dropsies	1	·2	2	·4
Rheumatism	64	·14	44	·07
Syphilis	50		24	·07
Gonorrhea	26		36	
Ulcers	71	·1	57	
Erysipelas	10	·3	2	·07
all other diseases	342	1·2	238	·9
Total	1.082	9·3	·981	18·06

1 Fevers. Under this head are included typhus, intermittent, continued & Yellow Fevers. This latter rarely seldom or perhaps never occurs in temperate climates, unless the temperature approaches that of the Tropics as in the Mediterranean, where it sometimes is seen, and indeed at Gibraltar, with considerable virulence, however it always disappears on the approach of winter. It was among those troops stationed at the Ionian islands that almost all the cases of Intermittent and Remittent Fevers, occurred, which in the above table raises the mortality among the Military, to more than double that occurring and proving fatal,

to the Naval force. the ratio of deaths to attacks however is much the same, among the sailors being 1 death to 56 of those attacked, and among the soldiers 1 to 57.

Among the troops in the United Kingdom 1·6 per 1000 may be computed to die of fever annually, and among the civilians the ratio is somewhat less being about 1 death per 1000 annually.

Dr. Alison states that the proportion of deaths from fever to the whole mortality, in the year 1838, in the following towns, was as follows. In London 7·7 p cent. in Manchester 7·7 p.cent. in Liverpool 6·9 p.cent. in Birmingham 5 per cent. in Leeds 3·6 p cent., while in Glasgow on an average of seven years, it was 11·8 p cent.

In Paris the mortality from fevers would appear to be less, than in Britain, being about 7·4 per 1000 inhabitants.

In St. Petersburgh, fevers are computed, according to Krafft, to occasion one third of all the deaths.

In Berlin, fever would appear to be very fatal.

In Cadiz, during the years 1800, 1804, 1810 and 1819, the yellow fever raged so violently, as to increase the average annual mortality of years when no yellow fever prevailed 569 on the whole deaths, namely from 2334 to 2903.

The mortality from fever, has been much demenished, in London, since the commencement of the 18th century. The susceptibility to be attacked by fever, is greatest among individuals under 10 years

of age, and from 20 to 30, whilst the highest ratio of mortality among those attacked is from 40 to 50

2 Eruptive Fevers. The ratio of mortality from diseases of this class in London, would appear to amount to ~~L~~ about 1.5 per 100, and four fifths of this mortality occurs under the age of 5 years, being from smallpox, measles, and Scarlatina. It is computed that in London 12,000 die annually by smallpox, through the neglect of their parents, attending to vaccination.

Among the Military, smallpox causes a very small amount of mortality, as all soldiers on whom distinct marks of vaccination do not appear, have to undergo that operation on enlistment. Eruptive fevers however are much more common in the Navy, nor will it excite surprise, when it is considered that a considerable proportion of a ship's complement consists of boys, at that period of life when they are liable to many of the eruptive diseases of childhood, and that the individuals are in more close contact with each other there, than on shore.

3 Diseases of the Lungs. Dr Young, writing in 1815, attributed to Phthysis, as Heberden &c. had previously done, full 25 per cent of all the mortality of England. In his work on Consumptive Diseases, he says, that Consumption is in almost all civilized countries, the most extensively and inevitably fatal of diseases. He also says that, the frequency of consumption in Great Britain, is usually such, that it carries off about one fourth of its inhabitants; at

* Journal of London Statistical Society Vol I. page 145.

Paris the mortality of consumption has been estimated at one fifth, and at Vienna it is said to be one sixth of the whole. But the mortality at Paris and in the South of France, from con= =sumption, has frequently amounted to one fourth of the whole.

Dr Woolcombe, of Plymouth, calculated that the annual mortality in England, from consumption alone, amounted in 1808 to 50,000, and Sir James Clarke's estimate is ap= =parently higher than Dr Youngs being for the 121 years end= =ing with 1821 as follows.

For the year 1700, the deaths from Consumption, were to all those of the year.	·145
1700 to 1750 — — —	·214
1750 - 1801 — — —	·263
1801 - 1811 — — — —	·288
1811 - 1821 — — — —	·316
General average for the 121 years	·245

or 1 death out of 4. And he adds, "It now appears (1835) to con= =stitute one third of the whole"* This last would seem to be a too high ratio of mortality, being considerably above that shown by the Registrar General's tables, which show that it con= =stitutes about one fifth of the whole deaths, or about 5 deaths annually out of every 1000 inhabitants

According to Colonel Tulloch's Report, the average mortality, among the troops in the united kingdom, from diseases of the lungs is about 8 per 1000 annually, and of the fatal

cases of diseases of the lungs, nearly four fifths arise from con=
=sumption. Mr. Marshall computes that in civil life in Great
Britain, one fourth of the whole mortality is occasioned by con=
=sumption, and that among the troops employed in Scotland, the
deaths from diseases of the thorax, amounted to 46·5 per cent
of the whole mortality. Sir James M'Grigor, informs us, that
"in England, consumption is as frequent in the army as it is
in civil life, under ordinary circumstances, and when no
epidemic or contagious diseases prevailed, that he had found the
deaths from consumption to amount to one fifth, one fourth, and
in some regiments even as high as one half of the mortality."
Colonel Tulloch says, that, the highest estimates in civil life, rate
the mortality from this disease at one seventh of the deaths at all
ages: or if the observation be confined to adults alone, it may
possibly amount to one fourth part, which, at the utmost, is
only half as high as among the troops.
Continental writers, appear to think consumption more common in
Great Britain than on the Continent, but according to Mr. Marshall
nearly one fourth of the general mortality in France is by this disease,
and the frequency of consumption, among the natives of Madeira,
Naples and Sicily is remarked by various authors.
According to Krafft: consumption destroys one sixth of the whole
population of St Petersburgh; and pleurisies one fourth.
Of the general mortality of the Garrison of Gibraltar, during the

eight years ending 20th. December 1822. 28.4 per cent died, of diseases of the Chest, and during that period 227 men were discharged from the service in consequence of "Chronic affection of the Chest, under the head pulmonic"

The attacks from diseases of the lungs, are nearly twice as numerous, among the naval, as among the military force, employed in the Mediterranean, but the mortality is not half as great. Among those diseases of the lungs, in the Naval service, Catarrhs, occupy the most prominent place, which arises from the greater exposure of the sailor in performing the duties of the Ship. However the number of attacks and deaths from Phthysis, is considerably greater, among the Military.

From the statements of Sir James Clarke as seen at page it would appear, that, the deaths from Consumption has increased to a considerable extent in Great Britain. Sir J. Clarke is of the opinion, that the increase has taken place, among the middle and higher classes of society, and considerable importance is to be attached to his opinion, from his extensive experience, although Mr. Morgan, calculating from the books of the Equitable Insurance Office, attributes a lower rate of mortality to those classes.

The diseases of the Chest, most fatal in all those climates are the Inflammations, Pneumonia and Pleurisy.

4 Diseases of the Liver. This class of diseases is of very rare

occurrence, and productive of but little mortality, in this country, we may assume as the ratio of mortality in civil life here, 3 per 10,000.

Hepatitis, terminating in abscess, is far more prevalent in tropical than in temperate climates, affecting chiefly Europeans. In the Mediterranean command, diseases of the Liver, are of not unfrequent occurrence, more numerous and twice as fatal among the Military, than among the Naval forces. The lower rate of mortality may be accounted for, by the superior facility in the Navy of sending home chronic cases, and that even a short cruize at sea, is beneficial.

5 Diseases of the Stomach and Bowels. From the Registrar General's report, we see that this class of diseases occasions about 7 per cent of the whole mortality. There has been a great decrease in the number of attacks and deaths from Dysentery, in this country, probably owing to the greater cleanliness of the Inhabitants. The mortality among the Troops in the United Kingdom, from those diseases (excluding Epidemic Cholera) is about 5 per 10,000 annually. This class of diseases is not only less prevalent in the naval, than in the military force, but the mortality is little more than a third part as high, owing principally to the warmer stations and the rarity of dysentery, which is a great source of sickness and mortality among the troops. Dysentery once occurring in any individual is exceedingly apt to recur, and such chronic cases in the Navy are sent home. Sailors suffer less from diarrhœa

than Soldiers, but more from dyspepsia, constipation, and Inflammation of the Stomach, Bowels, and Peritoneum. The Sailor is much better off, as regards rations, than the Soldier, has more variety and in greater plenty.

Cholera, in a severe form seems to have been epidemic in Europe in the fourteenth century. In 1817, appearing in India, it has traversed almost the whole world: during the years of its prevalence in Britain, it occasioned a mortality of about 2 per 1000. among the troops in Britain in those years. the mortality reached the rate of 2·8 per 1000, and seemed to increase progressively with the advance of age. At Gibraltar, and throughout the Peninsula. it prevailed to a great extent in 1834, although the Navy there suffered little.

6 Diseases of the Brain. According to the tables of the "Equitable Insurance Office" the annual rate of mortality from this class of diseases is 1·5 per 1000 or 15 per 10.000., among the troops in Great Britain, it is only about the half. namely ·8 per 1000, The proportion of admissions to hospital was about 6 per 1000 annually, and the proportion of deaths to admissions was 1 in 9. Among the Naval and Military forces, in the Mediterranean. the rate of mortality from diseases of the Brain, was about 1 per 1000. the principal mortality among the sailors, being from apoplexy. and among the Soldiers from Delirium tremens. the opportunities of obtaining intoxicating liquors, being more common to the latter.

* Journal of London Statistical Society Vol II page 253.

The Lunatics, or persons of unsound mind in England, amount to several thousands, and are of all conditions and ranks of life The number of lunatics and dangerous idiots, under confinement in Middlesex, and in those parts of Surrey and Kent, within the jurisdiction of the Metropolitan Commission, was in 1839, 3110. and many persons insane in different degrees, remain at home under the care of their friends. It has been a question, whether or not Insanity is a fatal disease, and according to the statement of Mr. Farr, it is, while the mortality at the age 30–40 is 1·2 and at 40–50 is 1·5 per cent. in England and Wales, the mortality at Bethlem, where dangerous cases are carefully excluded, was from 1827-39, 9 per cent: annually; the rate of mortality annually, is greater in the acute, than in the chronic stage of insanity. The insane would appear to be more numerous in agri=cultural than in manufacturing districts. Suicides, are more common among the military, than among persons in civil life. Out of a total of 686 deaths, 35 or 1 in 20 arose from this cause alone among the soldiers, whereas among persons insured in the "Equitable" the proportion is only 1 in 110 deaths.*

7 Goitre and Cretinism. These from a peculiar interest at=tached to them, and from being so common in some of the deep vallies of the Alps, Apennines and Pyrennees. I have here made allusion to. Mr Marshall says that about two thirds of the Inmates of the Lunatic Asylum at

Milan suffered under Goitre; Goitre is sometimes seen in Scotland, and occurs frequently in Derbyshire.

The next subject should be the ratio of sickness among the inhabitants of Europe, but we shall defer that, until we shall examine the ratio of mortality & prevalent diseases in the other parts of the Northern Temperate Zone. As to Asia, I have been unable to procure any information, and very little as regards Africa.

The Climate of Egypt is asserted by all to be delightful. Sir James Clarke, in his work on Climate, eulogises it highly, and particularly advises patients requiring a dry, warm, and exhilarating climate to proceed to Egypt. Clot Bey says, that he never met a case of consumption among the natives, and that pneumonia and pleurisy are very rare; bronchial diseases and asthma, however, are frequent, but never lead to Phthysis. Nervous affections, including insanity are very rare, as also Rheumatism Gout, Tetanus and Carcinomatous diseases. The most prevalent diseases of the country, are dysentery, and Ophthalmia. The Plague seems to be perennially endemic in a certain extent of country, the centre of which is the eastern boundary of the Mediterranean, beginning in November in Egypt, it continues its ravages into Spring, and disappears as the Summer approaches. At Constantinople it prevails chiefly in Summer, & ceases during winter.

2 Ratio of Mortality in North America within the Temperate Zone. The average annual mortality in the United States would appear to be about 1 in 40 or 25 per 1000. In some of the districts the mortality is much less and in others as New Orleans it is much higher.

At New York, the rate of mortality, according to the population has been.

	Population	Deaths	Ratio
In 1805.	75.770.	2,297	1 to 32·98
1810	96,373.	2,073	1 to 46·49
1815	100,619	2,405	1 – 41·83
1820	123,706	3,326	1 – 37·19
1825	166,086	4,774	1 – 34·78
1830	197,112	5,198	1 – 37·92
1835	270,089	6,608	1 – 40·87.

This table gives a rate of mortality rather higher than 1 in 40, however we may take that as the average. It is also 1 in 40 at Philadelphia. This ratio is the same as that of France.

Prevalent Diseases of North America.

1 Fevers. At New York, it would appear that about one seventh of the deaths are caused by Fevers or about 3 per 1000. Scarlatina according to the City Inspector, is greatly on the increase in New York. Among the Troops in Canada, the mortality from fever is about 2 per 1000 of the force annually.

2 Pectoral Diseases. "At New York" says Mr Marshall "consumption seems to engross one sixth and sometimes a fifth of all the deaths"

The city Inspector remarks that "of the total deaths from Consumption 592 were natives of Great Britain and Europe: and the whole number of deaths belonging to the same countries being 1869, it follows that 1 out of 3.25 died of this disease: and of the whole remainder 1 in 7.66: but if we deduct the deaths of coloured persons by the same disease, which were 1 in 4.25. it leaves the deaths by consumption of the white natives of this country, as only 1 in 9.47: a disparity very great and unexpected" In Philadelphia, the relative number of deaths by phthysis is said to be as high as in Great Britain. Among the British Troops in Canada, the mortality from diseases of the lungs is about 5 per 1000 annually.

3 Diseases of the Brain and nervous system, constitute a large proportion of the deaths at New York, namely 19.41 per cent of the deaths or about 5 per 1000 annually

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Section IV On the Ratio of Sickness among the Indigenous Inhabitants of the North Temperate Zone.

The following observations on the ratio of sickness shall be confined to natives of Britain, as it is they, whom we shall confine our attention to, in the consideration of the effects of a tropical climate on the constitution of Europeans.

It was held by Dr. Price, that the proportion of sickness in human life, bore a constant relation to the mortality: but

* Journal of London Statistical Society Vol VIII. page 330.

that is not really the case. in fact the highest ratio of sickness is sometimes found associated with a favourable rate of mortality: for instance: the result of a comparison of the general results of mortality in Friendly Societies in England, with that in Scotland, will be, that the rate of mortality in Scotland, among the members of Friendly Societies is much higher than among the same class in England, and if Dr Price's theory were to hold good, there should also be found a greater amount of sickness in Scotland: but such is not the case. for instead of there being an increased ratio of sickness, the ratio is actually below that of England. in short, the excess of mortality is uniformly against Scotland, while the excess of sickness is as constantly against England. as will be seen by the following table. *

Age	Mortality per cent in England	Mortality per cent in Scotland	Excess of Mortality in Scotland p cent	Average Yearly Sickness in England	Average Yearly Sickness in Scotland	Excess of sickness in England p cent.
30	·7563	·7926	4·7997	·9107	·8376	8·0268
40	·9386	1·0767	14·7134	1·1808	·9767	17·2849
50	1·4267	1·5830	10·9538	1·9603	1·8548	5·3818
60	2·5054	2·9096	16·1331	4·1657	3·9423	5·3628

As may also be seen by the above table the period of sickness, for each man increases as age advances. In Rural districts the rate of sickness fluctuates up to 32 and from that age, upwards there is a uniform and gradual increase. In the Town districts there is found to be a similar increase from 27 upwards. and

in the City districts, it increases, throughout all the ages, as the following table will illustrate

Average Sickness per annum to each person. — in weeks.

Age	Rural Districts.	Town districts.	City districts	Those districts combined
20	·8387	·8564	·3659	·8398
25	·8630	·8649	·9650	·8744
30	·8753	·8794	1·1059	·9107
35	·8991	1·0114	1·2372	·9836
40	1·0677	1·2669	1·4663	1·1808
45	1·2537	1·8323	1·8125	1·4939
50	1·5896	2·5559	2·3831	1·9603
55	2·3260	3·3029	3·3036	2·7047
60	3·8531	4·9132	4·4973	4·1657
65	7·6305	9·1387	5·9019	7·7501
70	14·1949	15·4995	9·9610	14·0391
75	20·7848	24·0134	22·3864	21·4661
80	24·3545	32·9841	35·2065	26·9405

In the prime of life the diseases are in general acute, and speedily terminate in recovery or death, but as old age comes on, they assume a more chronic form, and as shown by the above table a man of 80 may expect to be confined to his bed, one half of the Year.

Among the Metropolitan Police Force, the average amount of sick=ness suffered by each man in one year, is 10⅓ days, hence the pro=portion of the whole force constantly sick is 2¾ p.cent.

Among the troops (Dragoon Guards & Dragoons) stationed in Great Britain, the ratio of admissions to hospital per 1000 of mean strength was 929 annually, on an average of 7¼ years. According to Colonel Tulloch, the average number constantly sick is about 40 per

1000 of the force. This corresponds with the results of 24 monthly musters in 1823 & 1824, referred to by Mr. Finlayson in his evidence on Friendly Societies. From those results we may ascertain the average period, each soldier is sick in the course of the year, and the average duration of each attack of sickness. as 40 × 365 = 14.600, ÷ 1000 gives about 14½ days of sickness to each soldier, & 14.600 ÷ 929 = 16 days. the average duration of each attack.

The above is the ratio of sickness, occurring among the soldiers of the Cavalry regiments, who would appear to be more healthy than the other troops. From the official returns at the Adjutant-General's office, it appears that in 24 monthly musters of different corps, in this country, forming an aggregate of 313.695 men, there were 14.049 on the sick list, and disqualified for duty, being at the rate of 44 per 1000 of the whole troops. The following is a Return of the mean annual strength of the troops employed in Scotland, for a period of 7 years from 1816 to 1822 inclusive, with the proportion of sick per 1000, the average number of deaths, and the proportion of deaths to the mean strength.

No. of Years.	Mean Strength.	Proportion of sick per 1000	No. of Deaths.	Ratio of deaths per 1000 annually
7	2975	36	33.	11.–

The following is a similar return of the troops in Ireland, from 1796 to 1829.–

No. of Years	Mean Strength	Proportion of sick per 1000.	No. of Deaths.	Ratio of deaths per 1000 annually
32	36.921	51.	576	15.

When we compare, the number constantly sick, which we have seen to be among the Cavalry 40 per 1000. with the ratio constantly sick, among those of the same age in civil life, we find that the proportion of sick is much higher among the troops. Among the workmen employed in the Government Dock Yards, of whom the annual average is 6.276, we find 2.552, annually attacked by sickness, being in the ratio of 407 per 1000, which is less than one half that occurring among the Cavalry. This striking disproportion, arises from the circumstance, that among the troops, every case of disease, however slight, is entered in the hospital book on admission; whereas in the Dock-yards, and among workmen generally, only those cases are recorded, which entirely disable the individuals for labour. This explanation is borne out by the fact that, while the number of attacks of sickness in the Dock-yards, was 407, the deaths amounted to 15 per 1000 of the strength; hence 1 in 27 of those attacked died; whereas, among the Cavalry, although there were 929 attacks out of every 1000, the deaths from disease were but 14 or 1 in 66 of those attacked.

When we compare the ratio of admissions to hospital, among the troops in the United Kingdom, with the ratio of admissions, which we have already ascertained to exist among the troops of the Madras Presidency, we find the latter considerably below the former, namely 615 per 1000 at Madras, in comparison with 929 per 1000 at home, the ratio of sickness of those troops in the Eastern Peninsula, was however, almost the same, namely

906 per 1000 of mean strength. The ratio per 1000 constantly sick among the troops in the United Kingdom, and among the native troops of Bengal and Agra, closely approximate, the former being 44 and the latter 47 per 1000. Hence we may conclude that the ratio of sickness is similar among the natives of Great Britain, and of India.

In the Mediterranean Squadron, the annual ratio attacked by disease is 1082 per 1000, although the ratio of mortality is only 9·3 per 1000, the annual ratio of invaliding however is 25·7 per 1000.

Section V On the Influence of the seasons, in the North Temperate Zone, on Health and Mortality.

The method, to estimate the influence, which the seasons exercise on health and Mortality, is to collect such tables, as may show the number of attacks of disease, and the number of deaths, which occur during the different months of the Year.

The Influence of the seasons in the Tropics, I have left to be considered when treating of the Influence of the Torrid Zone's Climate on European Constitutions

In London the Bills of Mortality, furnish data, from which some estimate of the Influence of the seasons may be deducted-

Table showing the Average mortality in each season, in London, occurring annually- on an average of 5 Years, from 1839 to 1843- inclusive-

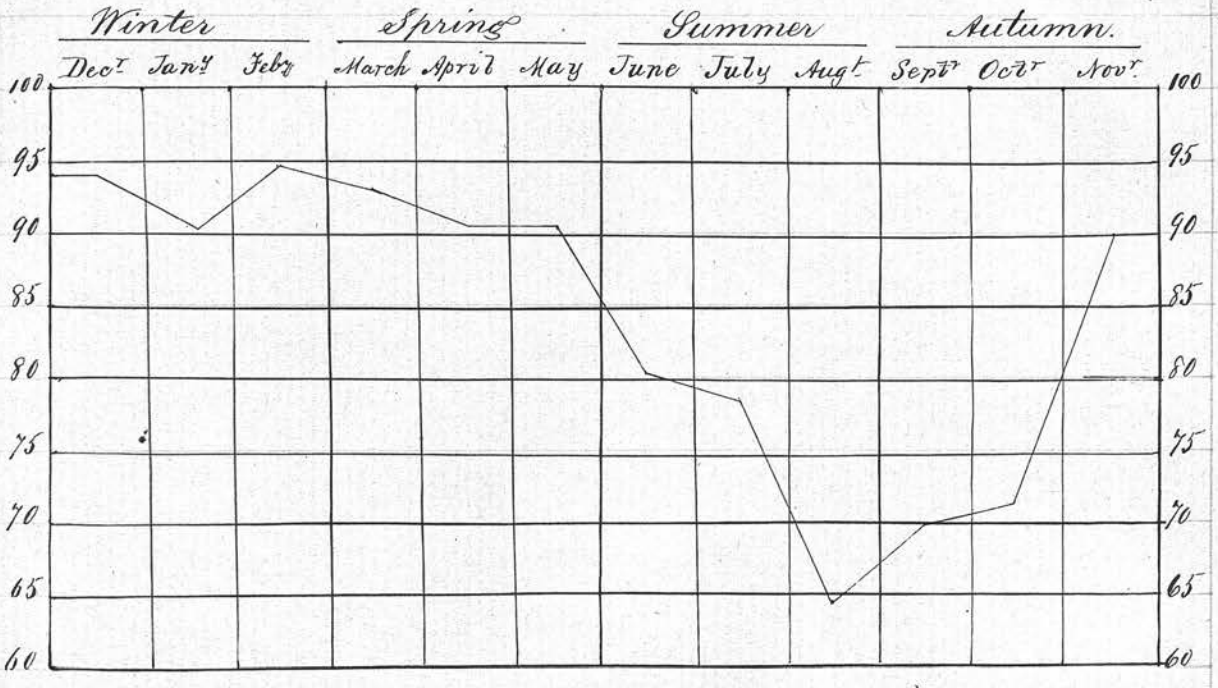
Quarterly average of deaths in Winter ending March 29th	Quarterly Average of Deaths in Spring ending June 28th	Quarterly average of Deaths in Summer ending Sept. 27th	Quarterly average of Deaths in Autumn ending Dec. 28th
12.600	10.960	11.131	12,239.

From this table we see that the maximum quarterly mortality occurs in the three months January, February and March; and the minimum quarterly mortality in the three months April, May and June; which agrees with a statement of Mr. Edmonds in his paper "On the sickness and Mortality of London Artisans", that the minimum quaterly sickness was in the three months May, June and July; and that the maximum quarterly sickness was in the three months, January, February and March; the maximum among those Artisans being to the minimum in the proportion of 4 to 3.

In the parish registers of Tavistock, the number of burials entered, from 1615 to 1836 amounts to 20.759, which are distributed over the several months asshown by the following table, and will be seen to agree with the above, remarkably.

Months	Total in each Month	Percentage proportion in each Month.	Total in each Quarter	Months	Total in each Month	Percentage proportion in each Month	Total in each Quarter.
March	1944	9·37		September	1582	7·62	
April	1841	8·87	5694	October	1538	7·41	4703-
May	1909	9·21		November	1583	7·63	
June	1730	8·38		December	1750	8·43	
July	1619	7·8	4954	January	1857	8·91	5408
August-	1605	7·74		February	1801	8·68	

The following diagram will illustrated the proportional mortalities in the different months and seasons, in Tavistock on an average of 50 years from 1787 to 1836



This diagram exhibits an almost uniform mortality from November to May, (inclusive) and a regular decrease thence to August, when it reaches its lowest point, and an equally regular increase from August to November.

Among the London Police force, the following table shows the proportion of Living constantly sick, during each month, on an average of eight Years.

Months.	Days of sickness in 8 Years.	Average Number Sick out of 100 Living	Months.	Days of sickness in 8 Years.	Average number Sick out of 100 Living
January,	31.021	3·77	July,	19,538	2·38
February,	22.639	3·02	August,	22,226	2·70
March,	22.550	2·74	September,	20,807	2·62
April,	24.994	3·14	October,	21,332	2·60
May,	20.010	2·43	November,	23.145	2·91
June	18,687	2·35	December,	25.442	3·10
Total				272,391	2·81

*Journal of London Statistical Society Vol I page 278.

The results afforded by the preceding table are much the same as those before refered to, by Mr Edmonds, and we may conclude, that the re=
=lative sickness among the general population, in any month, is greatly dependent on the temperature of that month.

The accompanying extract from the mortality returns for Glasgow in 1838, shows a similar result, the maximum being in January and the minimum in July-

January.	February.	March.	April	May.	June.	July.	August.	September.	October.	November.	December.
899	841	717	573	533	434	411	459	474	495	499	397
Total 6932											

The progressive increase or decrease of sickness and mortality is sufficiently regular, when no epidemics supervene, the sickness gradually increasing, as the temperature of the months decrease. The disturbing effect of the usual epidemic diseases, is to elevate considerably the maximum for January and to elevate in a minor degree, the relative sickness of the months of April and August. Dr A. S. Thomson in a Statistical Enquiry on Fever,* states that, "Fever is most prevalent from July to December inclusive, The intensity of fever is much greater during January, February, March, April and May, than at any other part of the Year. During those months in which fever is most prevalent, the temperature and quantity of rain are considerably greater than during those months, in which fever is not so prevalent. During those months, in which fever is most intense the temper=

=ature and quantity of rain are comparatively low. The prognosis of fever is more favourable from June to December, than from January to June."

We have seen, that, among persons in civil life, the autumnal months are the least fatal, the reverse, as shall now be shown, is the case in the army.

The returns of the Dragoon Guards and Dragoons only, are com=
=prised in the following investigation, these extend over a period of seven Years. The month in which there was the greatest number of admissions was August; the other months follow in the annexed order, July, May, September, June and October, being the six hottest months, then December, January, April, March, February and November.

Table, showing the admissions and deaths, in each month, from 1000 acute diseases among the Dragoon Guards and Dragoons.

N. B. In May the deaths were raised above the usual average by the prevalence of Cholera among the troops, during that month in 1833.

Months	Admissions	Deaths.	Months	Admissions	Deaths.
January.	85	68	July.	88	91
February.	76	49	August.	107	110
March.	71	80	September.	93	98
April.	77	72	October.	81	83
May.	88	117	November.	70	76
June.	84	80	December.	80	76
			Total	1000	1000

It will thus be seen, that the smallest number of attacks among the troops occurs, in November and through the winter, they are considerably under the average, some cases, however will occur, among those absent on furlough, which is permitted to a limited number, between 1st. November and 10th. March, but that is not sufficient to account for the different result, between the troops and those in civil life. There must be some secret agency, which has hitherto eluded detection, leading to that difference, in the liability to disease, at the same seasons, between the military and civil population of the same country, as the foregoing statements would lead us to suppose. Whatever the causes may be which give an unhealthy character to the autumnal season among our troops, they operate no less powerfully in the French army; but there they seem to be a month later in coming into action, and to continue a month longer, than in this country. The following table shows, the number of deaths in each month, on an average of six Years, 1832-37, in the Kingdom of Saxony.

Months.	Deaths	Months	Deaths	Months	Deaths.
January	4215	May	4564	September	3686
February	4474	June	3703	October	3595
March	4689	July	3612	November	3659
April	4650	August	3816	December,	3793.

The greatest mortality on an average of six years, we see to have

been in March. showing a tendency, in the greatest mortality of places as we approach the Tropics, to appear in the warmer months.

In the country, the relative mortality of January is greater and of June and July, less than in the towns: and this is an additional proof that the seasons exercise an influence over mortality, as in towns from the shelter afforded by the buildings, and the warmth from the number of fires, the temperature of the atmosphere will not be so cold in winter as in the country. Hence invalids and those of a weak constitution should reside in the country during sum= =mer and in the town during the winter months.

We have stated above, that as we approach the Tropics, the season of greatest mortality changes from winter ~~into~~ autumn, In support of which statement, we shall insert the following tables.

Table, showing the number and ratio of deaths per 1000 in each months occurring among the Troops stationed in France.

Months	No. of deaths	Ratio per 1000 deaths	Months	No. of deaths	Ratio per 1000 deaths.
January	1402	82	July,	1279	75
February	1334	78	August	1607	94
March	1432	84	September.	1577	92
April	1475	86	October,	1638	96
May	1450	85	November,	1381	81
June	1257	73	December.	1260	74
			Total	17.092	1000

Here we have the greatest mortality occurring in the months of August, September and October,

The following shows the mortality of the different months among the population of Cadiz from June 1837 to May 1838 (inclusive)

Months.	No. of Deaths	Months	No. of Deaths.
June	212	December	162
July	240	January	176
August	226	February	182
September	165	March	172
October	182	April	189
November	176	May.	176

Here we see that June July and August have the highest mortality. In New York on an average of the 32 years from 1805 to 1836 inclusive, the mortality in the different months, is represented in the following order; the total being taken as 10,000, and the months taking precedence according to their relative mortality:

Months.	Average number of deaths	Months.	Average number of deaths.
August	1248	January	754
July	1060	November	753
September	1008	February	739
October	850	April	714
December	776	May	707
March	755	June	636

Here again we see that it is the Autumnal months, which are the most unhealthy, and when we come to consider, the influence which the seasons exercise on the health and mortality within the Torrid Zone, we shall find that there the months of Autumn are the most unwholesome, more especially in the West Indies

Section VI Climate of the South Temperate Zone: Indigenous Inhabitants, and Ratio of Mortality

This Zone embraces a small portion of Africa, the principal part of New Holland, New Zealand, and a portion of South America.

The mean temperature of the Southern Temperate Zone, has been estimated by Baron Humboldt, to be at least 10° Fahrenheit less than that of the Temperate Zone of the Northern Hemisphere: but as his conclusions were drawn from Experiments made on the shores of South America, where the land is chiefly accumulated, they may require to be somewhat modified. According to observations made by Dr A. S. Thomson in New Zealand, the mean temperature at Auckland is about 59° for the year, which is about 8° less than the mean annual temperature of Malta, in the same latitude in the North Hemisphere, and is about equal with the mean annual temperature of Rome and Nice, in Latitudes 41° 52' N. and 43° 20' N. or 5° and 7° further removed from the Equator.

The observations of Captains Scoresby and Weddell, show that so great a difference in the temperatures of the North and South Temperate Zone, as stated by Humboldt, does not exist in the Open Sea, although to some extent it holds true.

The following table, gives a comparison between the mean annual

* Sir James Clarke on Climate. 4th Edition page 361.

temperatures of places of like latitude in both Temperate Zones.*

Places.	Latitudes	Yearly Mean	Spring	Summer	Autumn	Winter
Funchal	32°30 N.	64°·96	62°·36	69°·56	67°·30	60°·60
Malta	36°55'-	67°·30	62°·76	78°·20	71°·03	57°·46
Rome	41°52'-	60°·30	57°·65	72°·16	63°·96	48°·90
Nice	43°20'-	59°·48	56°·23	72°·26	61°·63	47°·82
Sidney	33°53'S.	62°·89	63°·45	70°·93	64°·03	54°·62
Cape Town	34°- -	66°·56	65°·66	74°·30	67°·28	58°·64
Auckland	36°51'-	58°·43	56°·82	66°·38	59°·82	50°·68
Hobart Town.	43°- -	52°·34	52°·88	62°·96	57°·44	42°·26.

At the Cape of Good Hope, the climate is dry: but that dryness, which over a great part of the interior, occasions thorough barrenness, is experienced to a less degree near the settlements: there the number of days on which rain falls is about 75 in the course of a year, and the quantity averages 41 inches annually. At Cape Town, the prevailing winds are from the South east, and North West. the former during the Summer, and the latter during the Winter season.

In New South Wales the peculiarity of the climate is its liability to long droughts, and the prevalence of dry sultry winds. During the hot winds, which are from the North west, the thermometer gener-

* Edinburgh Medical and Surgical Journal. Vol 74- page 90-

ally stands at from 90° to 100° Fahr. and these hot winds are quickly succeeded by winds from the South, causing a rapid fall in the ther=
=mometer, so that extreme changes of temperature may occur several times a day, causing great liability to attacks of Catarrh. The Climate however is, on the whole, remarkably healthy.

The Climate of Van Diemans land, is very changeable, ~~would~~ but at the same time, would seem to operate by reducing, rather than, increasing the susceptibility to disease.

The Climate of New Zealand is very equable and mild; with a temperature never very high in summer, nor low in winter. The mean annual temperature of Wellington is 58°. of Auckland 59°. and of Bay of Islands, 64°. The number of days on which rain falls during the year at those three places, is. at Wellington 115 days. at Auckland 179 days and at Bay of Islands 99 days, and the quantity of rain at Wellington was 54.33 inches and at Auckland 51.84 inches annually *

The Climate of South America, would seem to be of a highly salubrious character, and in all parts alike healthy, whether situated in the torrid regions of the southern Tropic, or on the ice bound shores of Cape Horn.

As I have been unable to obtain any considerable amount of in=
=formation, regarding the ratio of mortality or prevailing diseases, among the aboriginal inhabitants of the countries, within the

South Temperate Zone, it would be superfluous to enter into any detail respecting them: they have generally received names after the countries they inhabit, as New Zealanders, Patagonians, Caffres &c. It will be quite allowable however to consider the residents there, as natives, the climate so much resembling that which they or their forefathers experienced in Europe, in the same manner as we considered the Africans, natives of the West Indies.

Ratio of Mortality and prevailing Diseases.

From the Army Medical Reports, it appears that the climate of the Cape of Good Hope, is at least as favourable, to the health of the troops ~~of~~ as Great Britain; the ratio of mortality among them, being about 13 per 1000 annually, at Cape Town, and probably somewhat less in the Eastern Province.

1 Fevers of the Remittent and Intermittent types, are extremely rare among the troops, and unknown among the inhabitants.

2 Diseases of the Lungs are rare at Cape Town, and still less frequent in the Eastern Province. There is a smaller proportion of deaths among the troops from Consumption, at the Cape, than at any other foreign station, except perhaps the East Indies. The low ratio of mortality among the troops, in the eastern province, is mainly attributable to the extreme rarity of diseases of the lungs, and there can be no doubt, that this portion of the

* Sir James Clark on Climate 4th Edition page 353.

Colony is more favourable to health than the United Kingdom-
Rheumatism would seem to be the most frequent disease, both among the troops and the civil population, prevailing, among the troops at the Cape, to a greater extent than in any other colony-

In Australia, according to the Army Reports, on an average of twenty years, from 1817 to 1836 inclusive, the mortality among the troops did not exceed 14 per 1000 annually, and even of that mortality fully a fifth arose from violent or accidental death, leaving about 11 per 1000 as the annual rate of mortality.

In Australia, Dysentery is the most prevalent disease, and the most fatal; few new comers escape an attack, and of the deaths among Convicts, one half is by this disease.

The other prevalent diseases, are Rheumatism, Ophthalmia and Catarrh.

The following table shows the proportion of diseases of the Chest, to the whole number of diseases occurring in the Hospitals of Hobart Town, Cape of Good Hope, Gibraltar, Malta and Ionian Islands-*

Places	Cases.	Pneumonia Pleuritis	Haemoptysis	Consumption	Catarrh
Hobart Town	30.102	576. 1 in 58	98. 1 in 307	104. 1 in 290	1657. 1 in 18
Cape of Good Hope.	25.506	673. 1- 33	55. 1 - 409	125 1 - 180	1320. 1 - 17
Gibraltar	58.227	2543. 1- 23	189. 1- 308	394 1 - 148	5786. 1 - 11
Malta	46.639	1391 1- 34	106. 1 -440	335 1- 198	3041. 1 - 15
Ionian Islands.	84438.	2272 1- 37	147. 1 - 574	239 1- 249	3401. 1 - 25

Among the Criminal population of Norfolk Island, we find by a report by Capt. Maconochie, that the principal diseases are Dysentery, Catarrh, Inflammations of the viscera, Fevers, Consumption, and Ophthalmia.

In New Zealand, during the year ending March 1849- there were 19 deaths, out of a force of 1919 men, or in the ratio of 10 men per thousand, being the least rate of mortality we have yet come to.

The following table, from Dr Thomsons paper, in the Edinburgh Medical & Surgical Journal vol LXXIV, shows the annual ratio of admissions into hospital, from different classes of diseases, among 1000 troops stationed in Great Britain and 1000 stationed in New Zealand.

Diseases	Great Britain	New Zealand.
Fevers,	75	10
Eruptive Fevers.	3	-
Disease of the Lungs.	148	56
— — Stomach & Bowels	94	55
— — Liver.	8	4
— — Brain	6	6
Dropsies.	1	4
Rheumatic Affections,	50	41
Venereal — —	181	24
Abscesses & Ulcers.	133	81
Wounds & Injuries	126	86
Diseases of the Eyes.	19	34
— — Skin	23	8
All other Diseases.	44	31
Total	921	440

By this table we see at a glance, which diseases, are most prevalent

and can compare their prevalence in New Zealand, with their frequency in Great Britain, at the same time we see that the number of admissions in Britain is more than double the number in New Zealand.

1 Fevers will be seen to be rare, and they are in general slight. only 1 man having died during that year, of fever at Auckland.

2. Diseases of the Lungs. will be seen to be about one third of the number occurring in Great Britain. but when ~~a~~ Consumption does show itself it is more rapidly fatal. as while the deaths from Consumption among the troops in the United Kingdom, are 8 per 1000 annually. in New Zealand, where the attacks are much fewer, they are 5 3/4 per 1000 annually. Among the natives, scrofula and consumption are common.

3. Diseases of the Stomach and Bowels. Rheumatisms and Diseases of the Eyes. constitute the other most common diseases -

In New Zealand, the vicinity of marshy grounds, which prove fatal in other countries, is not found to be unhealthy -

On the South American Station, which extends, both into the Torrid and South Temperate Zone. the sailors enjoy an immunity from disease, which finds no parallel, in the vital statistics of any quarter, the author of the Naval report states that the annual ratio of deaths from disease, was 7.7 per 1000. and that the salu=
=brious character of the climate manifests itself, not only in the com=
=parative rarity of fevers, but of all other diseases. He asks the

question "Why is it that in a land locked harbour, in this part of the world (South America), under a powerful sun, surrounded by marshes, and rank vegetation, ships lie for months or years, without the occurrence of a single case of concentrated fever, while in other places, in Africa, in Asia, in North America, and more especially in the West Indian Islands, things which to superficial observation appear to be the same, are productive of so much disease and death?"

By the preceding observations, we see that the colonies of Great Britain in the South Temperate Zone, enjoy a higher degree of salubrity than any place we can name, in the corresponding Zone of the Northern Hemisphere. These Colonies, rapidly rising in importance, New Zealand, very probably, at no distant date, becoming a competitor with England, for the commerce of the world, possess the great advantage of a most healthy Climate; so healthy that even the first settlers, should enjoy so low a rate of mortality, as we have now seen to be the case; free from all epidemic and endemic diseases. New Zealand is better adapted than any other Colony, to the European, con= =stitution.

Chapter IV

On the Influence of the Climate of the Temperate Zone on the Indigenous Inhabitants of the Tropics.

On this subject I have been unable to obtain any sufficient amount of information, fully to illustrate the subject. The natives of warm countries appear to suffer as much, in a cold climate, as the races from the temperate parts of the earth do, when dwelling in the plains of the tropics. Indeed we are warned of the danger of removing those, who have been born in the tropics to the frigid climates of our earth, by the mortality that occurs among them by our so doing, for instance, among the negro troops, who were stationed in Gibraltar from 1816 to 1820, the average ratio of deaths was 63 per 1000 annually. and of that number, about 24 was by Phthysis. In the states of New York and Massachusetts, the average annual mortality among the Africans, according to Dr Hawkins, is about 33 per 1000 or 1 death out of every 19. among which the most prevalent diseases was Phthysis. At Baltimore, the rate of mortality was 30 per 1000 or 1 in 33. Among the Negro troops brought from Africa, and serving in the Bahamas. Lat: 25° N. the deaths were at the rate of 41 per 1000.

Africans, who are transported direct from their native country, to temperate climates, as to Europe, seldom live over two or three years: but those who have come by a more circuitous route, survive much longer, so that the migration, would appear to be the more injurious, the more sudden the change.

In removing from a warm climate, as the Torrid Zone, to a colder one, the diseases most likely to prove dangerous, are those of the Lungs, as Phthysis, and on the removal from temperate or cold climates to warmer ones, Hepatitis is the most prevalent disorder, among the emigrants. In the case of the lower animals, those brought from the torrid Zone, to this country, as monkeys, suffer chiefly from consumption, and among those, brought from within the Arctic circle, as the Polar Bear, inflammation of the liver is the predominant disorder.

In the case of the Africans, transported from their native country to Ceylon, where the climate cannot be much less warm, ac= =cording to Mr. Marshall, four fifths if not nine tenths of the mort= =ality occurred from pectoral diseases, and chiefly from con= = sumption, and as we have also seen that this is the most fatal disease, among the negroes in the West Indies, we cannot conclude, that it is the low temperature alone, which is the cause, of such an increased liability to Consumption,

but that there is some peculiar state of their constitution, which conduces to the prevalence of Phthysis among them, who in their native country, are, as we have seen, almost entirely exempt from such a complaint. Although the temperature of the Cape of Good Hope, must be considerably below that of their native country, still there, the negroes do not suffer in any marked degree; we might almost say, because it is Africa.

From these remarks we may conclude, that man, although able to exist in any climate, is more peculiarly adapted, for that of his own race, or the country, of which he is the original inhabitant; in short, that the natives of tropical, as well as of temperate climates, are especially fitted by nature, for inhabiting and peopling, the respective portions of the Globe, wherein they or their forefathers were born, the effects of a transition to any other, being productive, of a great increase, in the ratio of mortality.

Having now finished the few observations, which I have been enabled to make on the effects of the migration of the natives of the Tropics to the Temperate Zone, I proceed to the fifth and last division of the subject, namely, the effects of the Climate of the Tropics, on the health and mortality of Europeans.

Chapter V.

On the Influence of the Climate of the Tropics on the health and mortality of the Indigenous Inhabitants of the Temperate Zone.

The following observations on the influence of the Climate of the Tropics on the health and mortality of the indigenous inhabitants of the temperate Zone, are confined to the examination of its effects on the natives of Great Britain, and our conclusions have been drawn from the statistics of the troops serving in different localities, which furnish the most useful data we can obtain for such calculations.

The mortality among natives of Great Britain, residing in foreign countries, is a subject of importance to the British nation, numerous members of which, are scattered over every quarter of the globe, and is also worthy of attention, in any inquiry into the causes of sickness among the troops of Britain, who have for the most part to serve abroad.

So far as statistical inquiries have extended, there is no country either temperate or tropical, where the mortality among the indigenous civil population, between the ages of 20 and 40, materially exceeds 16 per 1000 annually, and probably there is no country, where troops composed of the indigenous inhabitants are subject to a higher ratio. Among the military in Great Britain, we have seen

that the rate of mortality is about 15·3 per 1000 annually. This we shall take as the standard.

We have seen in a former part of this essay, that from some circumstances, ill understood, there occurs among the soldiers of Great Britain, even in the time of peace, and in their native country, a somewhat higher rate of mortality, than among the civil population of the same age, but, we may expect that the same circumstances shall operate equally in all localities, so that the amount of increased rate of mortality, which takes place among them in a tropical country, in time of peace, may be reckoned a measure of the deleterious influence of the Climate, of that country.

Section I On the Influence of the Climate of Tropical Africa on the Natives of Great Britain.

On this subject, I have been unable to obtain much information, but from what is told of this climate, we must consider it most prejudicial.

Among the British troops, who were stationed at Sierra Leone, the army reports, on an average of 18 years from 1819 to 1836, state the ratio of mortality to have been 483 per 1000 annually, which shows that about one half of the European force, employed there died yearly. This detachment is now withdrawn. Captain

Owen, in his account of the expedition, of which he had the command, in exploring the coast of Africa, states that during a voyage of three months, two thirds of the officers and one half of the crews of the three vessels, had fallen under the curse of Africa, namely fever. Numerous others instances, are recorded in Captain Owen's Journal, showing the deleterious effect of the climate of Africa, on the health of the crews under his command. The crews of the vessels, cruising near the coast of Africa, for the suppression of the Slave trade, suffer severely.

At St Helena, the British troops experienced a mortality in the ratio of 35 per 1000 annually, on an average of eight years from 1816 to 1822 and from 1836 to 1837—

The leading distinction between the diseases of temperate and intertropical climates, appears to be, that, in the former, the viscera of the head and thorax, or the nervous and re= =spiratory systems, are chiefly affected, while in the latter, the abdominal viscera, or the organs of assimilation, princip= =ally suffer. Fevers, in warm climates, seem chiefly to affect the stomach, as is seen in the black vomit of yellow fever. In cold climates, the brain and spinal marrow are commonly principally implicated, while the stomach more rarely suffers. These observations also apply, as regards, the increased frequency of Dysentery, Hepatitis &c. Tropical diseases, differ also, from those of temperate climates, by their violence or great proportionate fatal=

* Journal of the London Statistical Society Vol VIII page 78

=ity, and the extreme rapidity of their progress.

The principal diseases, which occurred at Sierra Leone, during the period formerly alluded to, were Fevers. Dysentery and Hepatitis. of these, fever was by far the most frequent and fatal, occasioning about nine tenths of the mortality. Of those admitted into hospital, fully 1 in 4 died -

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Section II On the Influence of the Climate of Tropical Asia, on the natives of Great Britain, with the prevailing Diseases.

The following tables, will show the rate of mortality, occurring among the troops natives of Great Britain, stationed in different parts of Tropical Asia -

Table, showing the amount of sickness, and mortality, occurring among the European troops in Ceylon, from 1830 to 1836 inclusive, and the ratio of mortality per 1000 annually on the whole. *

Years.	Mean strength	Number treated.	Deaths -
1830	2192	3148	94
1831	2186	3123	80
1832	2056	3009	204
1833	2002	2434	65
1834	2060	2723	91
1835	2005	2466	116
1836	2089	2875	77.
Total	14.590	19.778	727.

Annual ratio of mortality per 1000 of mean strength = 49·8.

By the preceding table, we see that in Ceylon, the troops, natives of Britain, suffer in the ratio of about 50 per 1000 annually, or 1 death to 20 men.

At Madras, on an average of twelve years from 1827 to 1838, the number of admissions to hospital among Europeans, annually was 1838 per 1000 and of deaths 48.6 per 1000

The following table from the report formerly referred to, on the Native Jails in Bengal and Agra, by Mr. Hutchison, will show the mortality, occurring annually at the different stations in these Presidencies - among the European troops -

Table, showing the mean strength and ratio of deaths per 1000 occurring among the European troops, at the different stations in the Presidencies of Bengal and Agra, during the year 1833 -

Stations	Mean Strength.	Deaths	Ratio per 1000
Presidency,	709	56	79
Dumdum,	772	54	70
Chensura,	577	49	85
Berhampore,	811	27	33
Dinapore,	1020	59	58
Benares,	1277	78	60
Allahabad,	112	6	53
Cawnpore	2057	176	86
Meerut,	1995	43	21
Agra	1089	27	25
Kumaul	1166	33	28
Sangur	89	2	22
Neemuch	325	22	67
Total	11.999	632	Mean 53 per 1000.

This ratio of mortality is higher than what we have stated, as occurring

* Journal of London Statistical Society Vol IV. page 142.

in the other Presidencies, but still not so high as it has been calculated by some authorities. The following table shows the rate of mortality ascribed to each presidency of India and to Ceylon, by Colonel Tulloch.

Madras Presidency	1826 to 1830	52 per 1000
Bombay ——	1826 to 1830	55 per 1000
Bengal ——	1826 to 1830	63 per 1000
Ceylon —	1821 to 1836	57·2 per 1000

From which statement, we are to conclude that the European troops employed in India suffer at the rate of about 60 per 1000 annually or four times as much as they would in the United Kingdom.

The following table, shows the mean strength, and the ratio of admissions to Hospital and deaths, among the European troops, at Moulmein in each of the following years.*

Years.	Mean Strength.	Ratio of Admissions &	Deaths per 1000
1829	946	1722	43·3
1830	971	1642	26·7
1831	933	1624	24·9
1832	882	1603	48·7
1833	848	1019	27·1
1836	897	1567	27·8
1837	876	1792	37·6
1838	1441	1765	40·9
Total	7794	Means 1592	34·6 per 1000

From this table, we see that the Eastern Peninsula, was much more healthy for the European troops, than the Peninsula of

India, as is also corroborated by a statement of the mortality at the other stations in the Eastern Peninsula, where it amounted only to 18 per 1000. and on the whole Peninsula 34·2 per 1000 annually. From the Army Reports from 1818 to 1836, we find that the average annual mortality among the troops, natives of Great Britain, serving in the Mauritius, was 30·5 per 1000.

Prevalent Diseases among Europeans, with remarks on the ratio of Sickness

In pursuing the general plan of the essay, we now come to the consideration of the prevalent diseases among the Europeans in Tropical Asia, along with which we shall consider for the sake of brevity, the ratio of sickness.

The following table, shows, the ratio per 1000 of admissions to Hospital and deaths, occurring among the European troops, at Madras, and on the Tenasserim Coast, on an average of 10 years from 1829 to 1838, with the principal diseases.

Diseases.	Admissions per 1000		Deaths per 1000	
	At Madras.	At Moulmein &c.	At Madras	At Moulmein &c.
Fever	349	440	5·57	7·92
Hepatitis	116	79	5·62	3·55
Diarrhœa	78	119	1·55	1·46
Dysentery	188	167	15·03	10·24
Cholera	27	6	7·6	2·8
Rheumatism,	102	70	·95	·61
Syphilis &c.	192	124	·57	·36
Ulcers	74	72	·22	—
Ophthalmia	72	23	·06	—
Other Diseases.	640	532	11·46	7·31
Total	1838	1632	48·63	34·25

Sir George Ballingall, in his Practical Observations on the Diseases of India, gives a general statement of the relative proportion of several diseases occurring among the Europeans at the principal stations under the Madras establishment, which agrees with the preceding statement - namely -

Dysentery	575	= 51.5 per cent.
Fever.	237	= 21.1 — —
Other Diseases	206	= 18.4 — —
Hepatitis	98	= 8. -
-Loss-	—	1. —
Total	1116	100 -

The following table, shows the mean frequency of attacks and deaths, with the ratio per 1000, from the different classes of disease, among the Military force in Ceylon, during the period from 1830 to 1836. Aggregate Force 14.590

Diseases	Attacks	Deaths	Ratio of Attacks &	Deaths per 1000
Fevers.	4654	82	319	5.6
Diseases of the Lungs	1158	83	79	5.6
— — — Liver	730	73	50	5.
——— Stomach &c	4720	283	323	19.4
Epidemic Cholera	344	107	24	7.3
Diseases of the Brain	93	20	7	1.4
Dropsies	77	13	5	.9
Rheumatism	490	2	34	.13
Syphilis &c	609	—	42	—
Ulcers	1507	1	103	.07
Erysipelas	26		2	—
Wounds &c	2086	51	143	3.6
All other Diseases	3284	12	225	.8
Total	19.778	727	1356	49.8

* Edinburgh Medical and Surgical Journal Vol XLI page 386

The following table shows the principal diseases, and the number of deaths therefrom, occurring among the European troops, employed in Bengal, during a period of seven years from 1826 to 1832, with the ratio of deaths per 1000.*

Diseases.	Total deaths in 7 years	Annual ratio per 1000
Fevers.	937	15.4
Pectoral Diseases.	162	2.5
Diseases of the Liver,	258	4.2
— — — Bowels.	1122	18.4
Cholera Morbus.	693	11.5
Diseases of the Brain	123	2.-
Dropsies	39	.6
Other Diseases	152	2.4
Total.	3486	57.-

1 Fevers. By the first table we see that fever is the most prevalent disease, both in India and the Eastern Peninsula, although not nearly so fatal as Dysentery. In Ceylon they prevail to about an equal extent, and in Bengal, Dysentery is the most frequent-, and the most fatal. On an average of these several tables the mortality from fever in tropical Asia, is 11.83 per 1000

2 Diseases of the Lungs. In the first table, diseases of the lungs have been classed with other diseases, which prevents any definite conclusions being drawn, as to the prevalence of this class of diseases,

in the Madras Presidency and the Eastern Peninsula. In Ceylon the deaths from diseases of the lungs, reach 5·6 per 1000 men, so that it approaches the mortality from the same class in Britain, namely 8 per 1000. According to Dr Shachan's returns, of the mortality among the European troops in the Bombay Presidency, for the year 1826, it appears that the mortality from "Pulmonary Consumption" amounted only to 2. per cent of the general mortality, which taking the general mortality at 55 per 1000 for that year, would amount to 1.1 per 1000., which is less than that occurring in the Bengal Presidency, when the mortality from all the diseases of the chest, amounted to 2·5 per 1000 annually. The prevalence of consumption among the troops serving in the Peninsula of India is lower than in any other British possession, being about 2 per 1000 of the mortality.

3 Diseases of the Bowels - Dysentery. These diseases would seem to occasion fully one third of the mortality in Madras and the Eastern Peninsula.; according to the table by Sir George Ballingall, one half of the mortality in the Madras Presidency arose from Dysentery, with which opinion Mr Marshall agrees. In fatality Dysentery stands much higher than fever, on an average of the preceding tables, the mortality being 16·57 per 1000 annually,

4 Cholera does not stand high as regards the number of attacks, in the Madras Presidency and the Eastern Peninsula, but

it was by far the most fatal disease; at Ceylon it caused a large mortality namely, at the rate of 7.3 per 1000 annually.

5 Diseases of the Liver. Hepatitis, although not nearly so frequent, cause a mortality nearly equal to one half of that from fever, being on an average of the preceding tables at the rate of 4.59 per 1000 annually. Hepatitis is often combined with inflammation and ulceration of the mucous membrane of the colon, which constitutes the dysentery of tropical climates, and of the numbers who die apparently of dysentery, the liver is, in all probability, obviously disorganized in about one half.

Mr. Marshall states that he has seen, tropical dysentery, combined with abscess of the liver, occur among troops, in less than ten days after they had landed.

The other most prevalent disorders among the European troops in tropical Asia, are Diseases of the Brain, Rheumatism, Dropsies, Syphilis and Gonorrhea, Ulcers and Ophthalmia, of which the most fatal are Diseases of the Brain, Dropsies and Rheumatism.

On examining the preceding table, we shall find that on an average there were 1608 admissions to Hospital annually per 1000 of mean strength, that is each man might expect to be in hospital once in every seven months, or nearly twice as often, as he would be were he in Great Britain. According to the observations of Dr. Burke, recorded in the forty first volumn

of the Edinburgh Medical and Surgical Journal, it appears that among the European troops in Bengal, on an average of seven years, from 1826 to 1832 inclusive, there was 1 death in every 30 cases admitted to hospital, which is double the pro=portion occurring in Great Britain. During the seven years over which Dr. Burke's observations extend, there was considerable var=iety in the proportion of deaths to cases treated, in 1826, there being one death in twenty-one treated, while in 1830, there was only one death in thirty nine treated.

The following table from Mr. Hutchison's Report on the Jails of Bengal and Agra, shows the number constantly sick, among the European troops, at the different stations of these Presidencies with the ratio per 1000.; during the year 1833.

Stations	Mean Strength	Number of sick	Ratio per 1000.
Presidency.	709	115	162
Dumdum.	772	131	169
Chensura.	577	88	152
Berhampore,	811	92	113
Dinapore,	1020	128	125
Benares,	1277	172	134
Allahabad,	112	27	241
Cawnpore,	2057	395	192
Meerut.	1995	157	78
Agra.	1089	96	88
Kurnaul.	1166	73	62
Sangur,	89	23	258
Neemuch,	325	54	166
Total	11,999	1531	Mean. 129

From this table, we see that there is a very considerable variation at different stations, the reason for which, we shall shortly consider here=

after, in treating on the influence of locality on the health of troops within the tropics. Taking the mean of the whole stations, it appears that out of every 1000 men there were 129 confined to hospital or about 1 sick for every seven healthy or one eight of the force unfit for duty, which calculation gives to each man about 46 days in hospital annually. Comparing this amount of sickness, with that occurring among the troops in Great Britain, we see the influence of the Climate of India, in increasing the ratio of sickness as well as of mortality. In Britain we saw that the average number constantly sick, was 44 per 1000. while in India it is 129 or three times as much.: in Britain the average amount of sickness to each man is 18½ days annually, in India the same man would suffer 46 days per annum.

Section III. On the Influence of the Climate of Tropical America, on the Natives of Great Britain, with remarks on the Prevalent Diseases.

Ever since the first discovery of the West Indies, to the present time all expeditions and emigrations to that part of the world have been attended with great mortality. Columbus and his companions suffered severely, and succeeding adventurers

have not been more fortunate. The greater part of the expedition sent against Hispaniola and Jamaica, by Oliver Cromwell perished by disease. The unfortunate expedition against Carthagena is remembered more from the mortality which attended it, than the want of success. Dr Lind, writing in 1808 says that in Jamaica, "the number of English sacrificed to the climate is hardly credible, and only to be guessed at from the common computation, that this island formerly buried to the amount of the whole number of its white inhabitants once in five years;" however it has, of late become more healthy

Among the islands in the West Indies, belonging to Britain, we may reckon Antigua as the most healthy, next to which comes Barbadoes, the most unhealthy being the Bahamas, Tobago & Dominica - The French settlements of Cayenne, Martinique and Guadeloupe are very unhealthy as also are different parts of the Spanish West Indian possessions.

The Troops employed ~~employed~~ in garrisoning the British Possessions in the West Indies, are divided into the following Commands. 1st The Windward and Leeward Command, 2nd The Jamaica Command, 3rd The Bahamas and 4th The Honduras Command. The examination of the two first Commands, will be sufficient for our purpose

The Windward and Leeward command, extending from 6° to 17° North Latitude and 56° to 63° West Longitude. embraces British Guiana, and the islands of Trinidad, Tobago, Grenada, St Vincents, Barbadoes, St Lucia, Dominica, Antigua with Mount=serrat, and St Kitts with Nevis and Tortola. Of these Trinidad, Tobago, St Lucia, and Dominica, are mountainous, covered with dense forests, with a moist soil, damp climate, and variable temperature, Antigua and Barbadoes, are low, barren, and rocky, with a scanty soil, a dry climate, and an equable temperature, the other islands are of an intermediate character, British Guiana, is a low, level country, covered with forest, and during the rainy season, presenting an almost endless succession of swamps and marshes, with a humid Climate, and a rather equable temperature. We shall find by the following table that it is in the first=mentioned islands, where the mortality is highest, that it is less in British Guiana, and least in the other two islands mentioned, as if the mortality principally depended on the changeability of the temperature, which although to a great extent, is not entirely correct.

The number of white troops employed in this command, during the twenty years from 1817 to 1836, has varied from 3264, to 5462, the average being 4333. of this force there died in 20 years 7069, being about 85 per 1000 annually or nearly six times as much as among the troops in Great Britain.

The following table, shows the annual ratio of mortality per 1000 at each station of the Windward and Leeward Command, with the average of the whole, for each year from 1817 to 1836 inclusive,

Years.	British Guiana	Trinidad	Tobago.	Grenada.	St Vincents.	Barbadoes.	St Lucia.	Dominica	Antigua &c.	St Kitts &c.	Average of whole Command.
1817	64	257	235	190	148	123	87	559	54	70	162
1818	27	398	176	105	96	77	206	209	35	170	126
1819	73	132	222	68	33	59	92	67	30	9	83
1820	160	30	814	57	36	102	81	63	25	74	105
1821	217	23	270	75	55	121	123	396	49	106	109
1822	77	66	88	45	63	58	394	99	32	15	77
1823	60	60	25	24	71	23	123	76	50	51	49
1824	117	68	54	19	66	49	229	57	20	60	70
1825	94	108	87	57	77	49	93	110	32	126	76
1826	95	92	135	48	55	44	75	133	26	31	68
1827	144	79	64	30	91	34	272	68	54	17	85
1828	134	167	94	135	44	37	60	43	67	39	81
1829	59	21	116	69	36	49	88	97	53	63	58
1830	82	41	148	15	25	49	142	94	30	52	65
1831	110	62	135	21	27	66	74	68	36	25	69
1832	34	73	67	34	50	94	56	91	24	45	64
1833	55	49	75	19	23	36	108	132	43	80	50
1834	53	42	39	27	19	25	73	110	38	44	43
1835	60	62	34	54	26	32	93	141	78	83	57
1836	35	67	269	85	40	53	197	69	37	172	77
Average	84·-	106·3	152·8	61·8	54·9	58·5	122·8	137·4	40·6	70·-	78·5

This table, which shows, that on an average of 20 years, the annual rate of mortality among the White troops in the Windward and Leeward Command, amounted to 78·5 per 1000, also shows how exceedingly variable is the mortality, in different years as well as in dif=ferent places. In Tobago, for instance, we find that in one

year 1820, four fifths of the whole force were cut off, and in several other years, one fourth died: yet in 1823, the mortality amounted only to 25 per 1000. Again, whilst in Tobago, Dominica and St Lucia, the average annual mortality was from 152·8 to 122·8 per 1000 in Antigua, St Vincents and Barbadoes, it has only been from 40·6 to 58·5 per 1000 annually.

Each of these islands likewise, seems to affect the health of the troops differently, as regards the diseases from which they suffer, as we shall hereafter see, under the head of Prevalent Diseases.

We shall now examine the mortality among the White troops in the Jamaica Command.

The island of Jamaica, situated about 900 miles to the west of the Windward and Leeward chain, extends, from latitude 17°35' N. to Lat. 18°20' N. and longitude 76° W. to long. 78°40° W. It is about 170 miles long and 50 broad; and throughout its whole length runs a lofty chain of mountains, intersected by two defiles, through which communications have been established.

On the south side, the island is level, consisting of a long plain, about 8 or 12 miles in breadth, which extends from the base of the mountains to the sea, on which plain, or in its immediate vicinity the principal towns and largest military stations are situated; the soil there is fertile, and watered by numerous rivers. On the North side, there are few plains or level surfaces of any extent,

, the country presenting features becoming bolder in their out= =line, from the sea, till they join the high range in the interior. The soil is a chalky, marl, with a rich verdure, and watered by many rivulets and cascades. In the interior, the island presents the appearance of a highland district, with dense woods, and in some parts rugged, in others with a wide expanse of table land; there the ground is clear and open with rich grass. An island with such varieties in its physical aspect must present a cor= =responding diversity in climate. On the plains the heat is great and on the approach of the rainy season oppressive, in the interior the heat is much less, the great elevation producing a correspond= =ing diminution in the temperature. The climate is humid through= =out.

The number of White troops employed in Jamaica, averaged in 20 years 2578 men annually. and there died in that time 6596, or 128 per 1000. annually. of these only 6254 will be accounted for, as the others were from accidental death &c.

The mortality among the white troops from all causes, from 1803 to 1816, amounted to 127 per 1000 annually. so that those two periods correspond remarkably, and show the fatal character of the climate.

The following table from Colonel Tulloch's report, shows the annual ratio of mortality per 1000. among the White troops, at each station in Jamaica, with the annual average

at each and for the whole, for each year from 1817 to 1836 inclusive

Years.	Up. Park Camp.	Port Royal.	Fort Augusta	Spanish Town	Stony Hills	Port Antonio	Falmouth	Montego Bay	Maroon Town	Lucea	Average of the whole Command.
1817	83.	39	34	128	97	192	74	89	None	71	88
1818	65	50	33	278	37	89	67	87	10	95	89
1819	501	316	103	68	301	346	130	-	12	79	294
1820	160	58	92	273	50	84	192	-	29	45	153
1821	130	225	44	91	45	219	53	-	26	41	116
1822	443	205	57	242	47	52	117	57	30	76	171
1823	82	83	31	200	25	51	24	-	35	87	65
1824	45	100	81	207	30	194	52	217	38	64	84
1825	341	321	58	399	453	94	184	-	30	178	307
1826	72	94	61	186	18	147	227	-	21	43	80
1827	225	155	280	164	287	233	233	-	30	30	224
1828	118	18	84	82	37	135	61	212	41	12	74
1829	43	82	70	57	13	124	57	109	15	35	62
1830	120	148	42	124	18	185	86	-	58	350	97
1831	110	34	79	236	174	226	253	-	48	-	133
1832	91	32	24	57	72	173	75	358	67	167	111
1833	78	39	56	67	31	117	70	174	81	35	86
1834	70	107	57	155	35	25	95	121	16	26	93
1835	52	36	70	194	34	-	84	54	4	25	75
1836	51	9	60	144	21	-	38	348.	29	160	61.
General Average	140·6	113·1	73·5	162·4	90·2	149·3	102·6	178·9	32·7	84·9	121·3.

From this table we see, that on an average of 20 years, the annual rate of mortality from disease, among the White Troops in Jamaica amounted to 121·3 per 1000. At different stations the mortality varied much, for, while at Montego Bay, it averaged 178·9 per 1000 annually, at Maroon Town, it only amounted to 32·7 per 1000. In different years also, a great diversity in the mortality appears, for while at

*Edinr Med & Surg: Journal Vol 38.

Port Royal in 1825, 321 per 1000 or fully one third were cut off. still there in 1836, the deaths only amounted to 9 per 1000. The Bahamas are very unhealthy. on an average of 20 years, the deaths amounting to about a fifth of the force annually. In the Honduras. the mortality was about 100 per 1000 annually

The following table, shows. the mean annual strength, of the French army, employed in the islands of Martinique and Guadeloupe, the number of deaths, and proportion of deaths per 1000. from the year 1802 to 1807 inclusive, compiled from returns published by M. Moreau de Jonnés.*

Years.	Strength	Deaths.	Ratio of deaths per 1000.
1802	4010	2394	570.
1803	4686	1674	357.
1804	3421	1005	293.
1805	5169	2090	404.
1806	5102	463	90.
1807	4959	622	128.
Mean	4538	1374	302.

This table shows the mortality among the French Troops in the West. Indies to have been excessive.

Among the Spanish Troops in Porto Rico. we learn, on an average of 14 years. from 1817 to 1830 inclusive, that the annual mortality was 59 per 1000. or less than one half. that occurring among the British Troops in Jamaica. These troops are recruited from the south of Spain in about 36° North Latitude, and with a mean annual temperature about 12° higher than that of South Britain. This

would appear to render the Spanish troops, less subject to the injurious influence of the West Indies than the natives of Great Britain. To this fact, however must be added another, possibly of greater moment than the difference of temperature of their native land, namely the habitual abstinence of the Spanish soldier.

Prevalent Diseases among Europeans in Tropical America

Dr. John Hunter, writing in 1788 on the Diseases of the Army in the West Indies says: that "the disorders that prove fatal to soldiers and Europeans in general in the West Indies, are of two kinds, namely, fevers and fluxes" and Dr. Lind in 1808 expresses the same opinion. We shall see that to this time, such is found to be the case.

Table, showing the annual ratio of mortality per 1000 of White Troops at the different stations of the Windward & Leeward Command, by the following diseases.

Diseases	British Guiana	Trinidad	Tobago.	Grenada	St Vincents	Barbadoes	St Lucia	Dominica	Antigua &c	St Kitts &c	Average of whole Command
Fevers.	59.2	61.6	104.1	26.3	11.5	11.8	63.1	49.3	14.9	42.1	36.9
Diseases of Lungs	6.4	11.5	11.-	6.6	10.5	15.8	12.5	8.3	9.-	9.5	10.4
— — Liver	1.-	1.1	2.-	4.5	1.6	1.4	1.-	1.7	2.8	2.2	1.8
— — Stomach & Bowels	8.9	17.9	24.-	16.1	24.2	20.8	39.3	70.3	9.2	10.3	20.7
— — Brain	4.4	4.7	5.	4.6	2.8	3.3	4.3	5.3	1.9	2.8	3.7
Dropsies	1.2	7.7	3.5	.8	1.6	2.4	2.-	.7	1.4	.9	2.1
All other Diseases.	2.9	1.8	3.2	2.9	2.7	3.-	.6	1.8	1.4	3.2	3.-
Total	84.-	106.3	152.8	61.8	54.9	58.5	122.8	137.4	40.6	71.-	78.5

The following table shows the annual ratio of mortality per 1000 among the white troops at the different stations in Jamaica, by the following diseases.

Diseases.	Up Park Camp.	Port Royal	Fort Augusta	Spanish Town	Stony Hill	Port Antonio	Falmouth	Montego Bay	Maroon Town	Lucea	Average of the whole Command.
Fevers	121.-	93.9	55.5	141.1	70.5	126.-	80.	150.7	15.3	63.2	101.9
Diseases of Lungs	8.5	7.3	9.7	9.1	6.5	5.2	8.7	7.9	6.3	10.2	7.5
— — Liver	.8	1.6	.3	.3	1.9	1.2	1.6	—	.3	.6	1.-
— — Stomach & Bowels	5.8	5.9	3.3	4.8	5.8	6.9	2.6	5.6	3.7	4.5	5.1
— — Brain.	2.	2.4	1.3	3.7	1.2	2.8	4.8	10.2	1.3	1.9	2.6
Dropsies	.8	.6	.7	1.6	1.9	2.4	2.6	1.1	2.4	1.9	1.2
All other Diseases.	1.7	1.4	2.7	1.8	2.4	4.8	2.3	3.4	3.4	2.6	2.-
Total	140.6	113.1	73.5	162.4	90.2	149.3	102.6	178.9	32.7	84.9	121.3.

1 Fevers. Endemic fever prevails to a much greater extent in the West than in the East Indies, in the West Indies, especially in Jamaica it is by far the most fatal disease. At Madras fevers occasion about one eight in Bengal about one fourth and in Ceylon one eight of the mortality among the troops, while in Jamaica 102 deaths out of 121 are caused by this class of diseases, or five sixths of the whole; and in the Windward and Leeward Command about one half. Mr Marshall ascribes to fever, even a higher share of mortality than the above namely 90 per cent of the whole mortality, and gives in support of that opinion, an abstract from a return by Dr Adolphus of the strength and mortality of the troops serving in Jamaica, from 1823 to 1825 inclusive, when fever caused 90.1 per cent of the

whole mortality, and certainly in some years and at certain stations fever may occasion even a greater proportion of the mortality. for instance, of 109 deaths which occurred among the troops in Tobago in 1820. 107 were from fever alone, or fully 98 per cent, but it is not always the case, for in St Vincents and Barbadoes it occasions only one fifths, and in Antigua one third of the whole mortality.

It would not appear that fevers proving so fatal to Europeans, are a necessary or even general consequence of continued exposure to a high temperature. for instance, the range of the thermometer, in Antigua and Barbadoes. is higher than in Dominica. Tobago. Jamaica. or the Bahamas: yet we find that the troops in the latter stations suffer three times as much as those in the former: and again were elevated temperature an essential cause of the mortality among the Europeans, we might expect every year to produce similar result. yet we find the mortality of one year sometimes 20 times as high as another, without any difference in the mean temperature. Neither is moisture a material cause of increase of fever. for in the moist climate of Guiana. the mortality from fever is only one half of that in the much drier climate of Jamaica. However, although heat and moisture may not be primary causes of fever, it is highly probable that they tend to increase its intensity, for the greatest average numbers of admissions to hos-

=pital and deaths take place in those months, when the greatest heat is combined with the greatest moisture.

The Officers would seem to suffer much less than the troops in the West Indies from all clapses of diseases, and especially from fever. the mortality among the Officers from that clapse being only about one half that occurring among the troops generally.

2 Diseases of the Lungs. In the returns of mortality among the troops in the Windward and Leeward Command, one of the prin=cipal features is the great prevalence and fatal character of diseases of the lungs. the ratio of mortality being 10·4 per 1000 annually, while in Britain it is 8. per 1000, in that Command also. 12 per 1000 are annually attacked by Consumption while in Great Britain, the number is about 5 ½ per 1000. In Jam=aica, although diseases of the lungs are not so productive of mortality as in the Windward and Leeward Command, they are as much so as in Great Britain.

Here, as elsewhere, of this clapse of diseases, consumption is the principal source of mortality, but at the same time, inflammation of the lungs and chronic catarrh are nearly twice as prevalent and twice as fatal as in Great Britain, showing how little effect a mere in=crease of temperature has in modifying these diseases. although we might expect that in the West, as in the East Indies, af=fections of the lungs would be rare. Having seen how pro=

=ductive of pulmonary disease, the West India Islands are, both among the white and Black troops, the Question of "is there anything peculiar in the climate, to cause so great an amount of pulmonary disease? nat=urally arises. If the climate were the cause, we should expect to see these diseases, equally manifested among the officers, as among the privates, but such is not the case, for while the troops generally, suf=fered to the extent of 9 per 1000 annually. the officers sufferred only at the rate of 2·5 per 1000 - which fact may be accounted for, by the officers having a better diet, than the common soldiers-

3 Diseases of the Liver - In the West Indies this class of diseases is the cause of only a small portion of mortality, when compared with that occurring in the East Indies, although in the island of Grenada it equals that of India being at the rate of 4·5 per 1000 annually for which peculiarity, no cause can be traced. This is the only class of diseases, by which officers in the West Indies, suffer more than privates, the rate of mortality among the Officers being 3·5 per 1000 annually, or double that among the troops generally -

4 Diseases of the Stomach and Bowels. Dysentery. This class of diseases is much less prevalent in the West than in the East Indies. although on some stations, as at Dominica and St Lucia, it occasions a very large part of the mortality, and is as we see by the preceding tables, much more fatal, in the Windward and Leeward Command than in Jamaica. and as a reason for which, we may state, that during the 20 years over which

those observations extend, in the former Command, the diet, for 5 days in the week, consisted of salt provisions, whereas in the latter Command, salt provisions were only issued for 2 days in the week.

Nothing need be said regarding the other classes of diseases.

Ratio of sickness among Europeans in the West Indies.

The following table, shows the total number of admissions, and rate per 1000, annually, during the period of 20 years from 1817 to 1836 inclusive, in the Windward and Leeward and Jamaica Commands, from each of the following diseases.

Diseases.	~~Windward & Leeward~~ Jamaica Command. Admissions		Windward & ~~Jamaica~~ Leeward Command. Admissions.	
	Total in 20 years	Ratio per 1000 of mean strength annually.	Total in 20 years	Ratio per 1000 of mean strength annually.
Fevers.	46,922	910.-	62,163	717.-
Eruptive Fevers.	10	.2	13	.2
Diseases of the Lungs	4,357	84.8	9,975	115.-
—— Liver	539	10.-	1,946	22.-
—— Stomach & Bowels	12,282	238.-	36,474	421.-
—— Brain	720	14.-	2,447	28.-
Dropsies	268	5.-	659	7.8
Rheumatic Affections.	1,479	29.-	4,202	49.-
Venereal ——	1,021	20.-	3,043	35.-
Abscesses & Ulcers	9,667	187.-	17,708	204.-
Wounds & Injuries	6,164	120.-	11,149	129.-
Punished	3,285	61.-	4,327	50.-
Diseases of the Eyes	4,644	90.-	7,686	89.-
—— Skin	337	6.-	539	6.-
All other Diseases.	1,760,	34.-	2584	30.-
Total	93,455	1,812	164,935	1,903

In the Windward and Leeward Command, in 20 years the aggregate strength was 86,661, and admissions to hospital 164,935, being at the rate of 1903 per 1000 annually, and in Jamaica, during the same period, the aggregate strength was 51,567 and the admissions to hospital 93,455, or 1812 per 1000 men annually. This is about 2 admissions to each man in the course of the year.

The average number of sick on the first day of every month during the same period, was, in the Windward and Leeward Command, 87 per 1000, and in Jamaica, 63 per 1000, so that although the mortality may be so great, the hospitals may not be more crowded than in Great Britain, on account of the rapid terminations of the principal disease (fever) either in death or recovery. So also the average duration of each attack of sickness is considerably less than in this country as will be seen by the following statement -

	Average sick time of each soldier per annum	Average duration of each attack of sickness.
In Windward & Leeward Command	27·75 days.	14·5 days
In Jamaica	23·- —	13·5 —
In United Kingdom	14·5 —	16·- —

We have by the the preceding observations and statistics, seen, that, the ratio of mortality, among natives of Great Britain, residing within the Tropics, is much higher than that which occurs in their native country, as it is, in almost every one, where they may dwell. except the Cape of Good Hope and Australia with New Zealand

In tropical climates, Europeans hold too much, to the mode of life to which they have been accustomed in their native country, eating too much animal food, and drinking too much of the intoxicating liquors of the country, for instance in the West Indies, the new rum, of which the soldiers consume large quantities, is accounted very prejudicial to the health, and the Spanish soldiers from their habitual abstinence, are subject to a much lower rate of mortality.

Section IV On the Influence of the seasons in a Tropical Climate on Health and mortality

In a former part of this essay we have seen that in the Temperate Zone, the winter months are the most fatal, and there also we remarked that as we advanced towards the Tropics, it came to be the Autumn Months in which the greatest amount of mortality occurred at least among the Europeans.

By investigating carefully, the atmospherical and meteorological phenomena most common at the unhealthy season, we might hope to find some solution of the mystery in which the cause of so much sickness and mortality is at present involved. But the following tables, afford little support for any general theory on that subject: although they show that the greatest mortality generally occurs, at certain periods of the year, yet that is not univers-

=ally true.

The following table from Mr. Annesley's work on the Diseases of India, shows the influence of the seasons on the number of sicks among both the native and European troops in the Madras Presidency, during the year 1815.

Months.	Among Native troops.		Among British troops.	
	Number of admissions.	Ratio per 1000 monthly	Number of admissions	Ratio per 1000 monthly.
January	394	125	223	74
February	199	63	194	64
March	190	60	212	70
April	152	48	223	74
May	171	54	253	84
June	267	85	263	87
July	328	104	330	109
August	294	93	243	81
September	233	74	221	73
October	354	113	318	105
November	293	94	246	82
December	274	87.	291	97.
Total	3149	1000	3017	1000

This table shows, that among the native troops in the Madras Presidency the months of January, October and July, occasion=ed the greatest amount of admissions to hospital, and that among the European troops, the months of July and Oct=-ober proved most sickly.

The following table, will show us what season of the year proves most disastrous in the West Indies, the climate of which we have seen is so fatal to the British troops.

Table showing, a general abstract of the total admissions and deaths, by all diseases, among the troops in the under-mentioned West India colonies, during the following periods.

Months	British Guiana For 19 Years		Grenada For 18 Years		St Vincent For 19 Years		Barbadoes For 19 Years		St Lucia For 19 Years	
	Total Admitted	Total Died	Total Admitted	Total Died	Total Admitted	Total Died	Total Admitted	Total Died	Total Admitted	Total Died
January	2899	97	785	25	819	32	3366	124	1202	75
February	2936	86	780	22	893	24	3385	115	1209	77
March	2743	81	773	22	877	41	3410	116	1168	61
April	2601	73	819	14	908	31	3895	91	1245	66
May	2758	59	817	20	1020	29	4389	141	1402	91
June	3174	103	789	23	1027	38	4202	139	1295	66
July	4248	180	780	19	971	29	4177	133	1382	62
August	4720	177	769	27	807	33	4041	131	1337	59
September	4536	155	880	52	716	37	3599	132	1259	55
October	4006	113	718	37	673	25	3492	160	1078	68
November	3387	76	747	32	661	23	3298	178	1185	56
December	3086	67	729	20	677	16	3127	129	1174	84

Months	Dominica For 19 Years		Antigua &c. For 19 Years		St Kitts &c. For 19 Years		Jamaica For 18 Years		Bahamas For 12 Years	
	Total Admitted	Total Died	Total Admitted	Total Died	Total Admitted	Total Died	Total Admitted	Total Died	Total Admitted	Total Died
January	644	38	1009	36	861	52	7465	539	458	8
February	533	28	1009	46	709	22	6725	351	377	14
March	624	41	925	36	646	26	6560	291	467	15
April	682	34	944	36	765	20	6560	262	482	15
May	606	22	941	26	868	30	7039	286	570	15
June	809	29	954	23	844	42	7303	323	476	10
July	926	39	999	26	796	30	7667	427	527	15
August	773	69	945	26	809	28	7769	786	568	35
September	782	51	958	30	818	30	7354	575	747	38
October	733	75	985	40	799	55	7730	640	765	33
November	716	91	941	46	809	56	7709	801	659	24
December	598	45	945	35	764	44	7260	725	544	18

From this Table it appears that though in British Guiana, Jamaica

and the Bahamas. the period from June to November is the most unhealthy, and most fatal to the troops, still in some other colonies as Dominica and St Lucia, every period of the year seems alike unhealthy, and in some, as Antigua and St Vincents' that period is the most healthy, which is in others, the reverse. although still, we may conclude, that on the whole, the greatest mortality, among the natives of Great Britain, residing in the West Indies, takes place during the months, of July, August, September, October and November, as the following statement of the numbers constantly sick among the white troops in Jamaica, and the deaths, in two quarters of 1827, will show.

Date		Reported sick in each month.	Deaths in each Quarter.
1st April	1827	237	
1st May	"	236	12
1st June	"	194	
1st July	"	251	
1st August	"	267	252
1st September	"	273	

Here the mortality, which was from a severe epidemic fever, was increased twenty fold during the months of July, August and September, without at the same time the, admissions to hospital, or at least the number constantly sick being much augmented.—

We shall now make a few observations on the influence of locality on the Health of troops in the Torrid Zone.

Section V On the Influence of Locality, on the Health of Troops, in the Torrid Zone.

It has been ascertained, that in our own country, there is a material difference in the degree of health and longevity enjoyed, by the rural inhabitants of some counties, compared with others, for instance, the mortality among those resident in Wales, in Devon, Cornwall, Northumberland and Cumberland shires, is not so high as among those, inhabiting the Central parts of the King=dom, so also the mortality is low in the Highlands of Scotland, and the troops are more healthy in the latter country, than, in either England or Ireland. But in most of our colonies, these differences are more strongly marked, almost every province, within the Tropics, furnishing us with instances of disease and death, occurring with great frequency in one place, while in another, only a few miles distant, the mortality may scarcely exceed that, to which the troops would be subject, in their native land.

The Island of Jamaica affords a good example of this, as may be seen by Table at page 132, by which it appears that at some of the stations the mortality, was five times as high as at others, within a few miles distance; for instance, Maroon Town, with a mortality of 32·7 per 1000 is only about 12 miles from Mont=ego Bay, where the mortality, reached the height of 178·9 per 1000 annually, or more than five times that of the other.

Again at some stations in Ceylon, the rate of deaths is quadruple, what it is at others, for while at Gallé 23 per 1000 and at Nuera Elia 24 per 1000 died annually, at Trin= =comalee, the rate of mortality was 91·4 per 1000 or four times as high.

In the Madras Presidency, a plateau, elevated 2500 feet above the level of the sea, among the Neilgherry Hills, enjoys a climate more temperate, than that of Great Britain, and medical officers and others, visiting those hills, inform us, that the change, on removing thence from the low countries, produces, a general restoration of mental and physical power, and an improved state of the health; and Dr. Blaikie remarks that "we may safely predict, that the number of deaths, among a body of troops stationed on these hills, would not be much higher than the average mortality among the Troops in Great Britain".

In the Bombay Presidency, a convalescent-station has been formed at Malcolmpett, on the Mahabaleshwar hills, at an elevation of 4500 feet above the level of the ocean, to which during the hot season, invalids resort, to gather fresh vigour from the temperate climate.

Also on the lower ranges of the Himmalehs, on the northern, and north-western frontiers of the Bengal Presidency, stations for con= =valescents have been formed; and if such localities be valuable for restoring the injured health, they must be still more so as the means of preserving it.

It is however, not to be supposed from these remarks, that the

elevated table-lands and mountain ranges, are the only places within the Tropics, where healthy situations for British soldiers are to be found, indeed the low rate of mortality at Gallé in Ceylon, &c., is sufficient to show that there may be many localities, in the low countries within the Tropics, highly favourable to their health, although on hills, we are more likely to find the most healthy spots.

On the coast of Brazil, where more rain falls than perhaps in any other part of the world, the British sailors enjoy as great immunity from fever and other diseases, as on the coast of Peru, where the supply of moisture, is always remarkably scanty, and years sometimes pass without any rain at all. In the South American Command, as already noticed the rate of mortality is very low, being only 7.7 per 1000, a rate unparalleled in the annals of Medical Statistics.

Having now concluded our observations, on the Influence of Climate upon Health and Mortality, I shall collect some of the most important facts, so that they may be rendered more evident.

The following table, shows the average annual mortality per 1000 of mean strength, among soldiers of the British Empire, employed in their native Countries

	Annual Mortality per 1000
British regiments, natives of the United Kingdom, and serving there,	15·3
Maltese fencibles, natives of Malta,	9·
Hottentot corps, aborigines of Southern Africa	12·5
Bengal Army, natives chiefly of the Northern provinces.	11·–
Madras Army, natives chiefly of the Peninsula of India.	16·13
Ceylon armed Lascareyns, natives chiefly of Ceylon from 1821 to 1835	25·8
Average annual mortality per 1000	14·95

By the above table we observe that the average mortality is below that of troops in Great Britain.

A Table showing, the mortality among natives of the Tropics, residing in Foreign countries but still within the Tropics will be found at page 62

The following table shows the average annual mortality per 1000 at the age of 29-30, in civil life in Britain

	Annual Deaths per 1000 at the age 29-30
Mortality at the age of 29-30, by the Carlisle Tables.	10·
Mortality by Mr Finlayson's observations, among Government annuitants	13·–
Mortality in 17 towns, where troops are generally stationed	15·7
Mortality among East India Company's labourers.	12·5
Mortality among parties, insured in the Equitable office, from 1801 to 1832, inclusive, between ages 20 to 40 -	9·1
Mortality among Metropolitan Police Force	9·–
Average annual mortality in civil life at 29-30, in Gt. Britain	11·5

Table, showing the average annual mortality per 1000 among Troops, natives of the British isles, serving in foreign countries during peace. with the amount of increased mortality per 1000, beyond that of Great Britain (namely 15·3 per 1000)

	Annual ratio per 1000	Increased mortality per 1000
Cape of Good Hope. Eastern frontier	9·8	
Cape District	13·7	
New South Wales	14·1	
Nova Scotia + New Brunswick	14·7	
Canada	16·1	-·8
Malta	16·3	1·-
Gibraltar	21·4	6·1
Ionian Islands	25·2	9·9
St. Helena	25·4	10·1
Mauritius	27·4	12·1
Bermudas	28·8	13·5
Tenasserim Coast	34·2	18·9
Madras Presidency	48·6	33·3
Windward and Leeward Command	78·5	63·2
Jamaica	121·3	106·-
Bahamas. (a small detachment)	200	184·7
Sierra Leone	483·-	467·7

From this table we see at a glance, the difference of the mortality which occurs among British troops, employed in temperate and in tropical climates, in which latter the mortality is in every instance higher, than happens in their native country.

These several tables, show the average mortality, which occurs among the Natives of the Tropics, when serving as soldiers, within their native country, and when serving abroad, and also among the Natives of Great Britain, residing in the United Kingdom, and when serving in foreign countries.

We here conclude our observations on Climate, and on its Influence on Health and Mortality. The subject in itself is of great extent and much importance, and although by no means new, is in its practical bearings, unfortunately, too much neglected. In this essay, we have had for our object, rather, to point out effects, than to speculate on causes, involved as they are in much doubt and obscurity.