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THE CLIMATE & RESOURCES
OF
MADEIRA.



MICHAEL C. GRABHAM.

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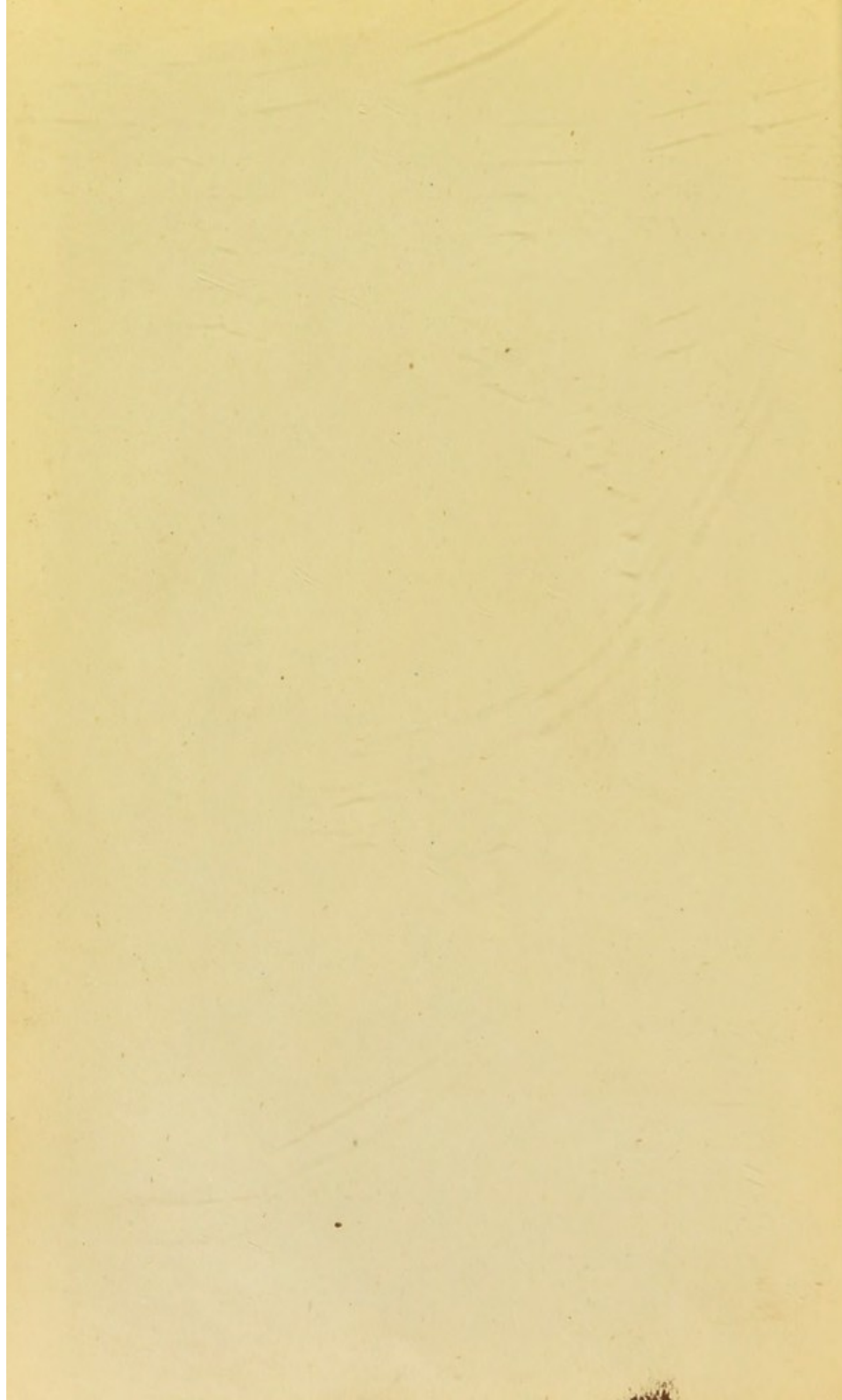
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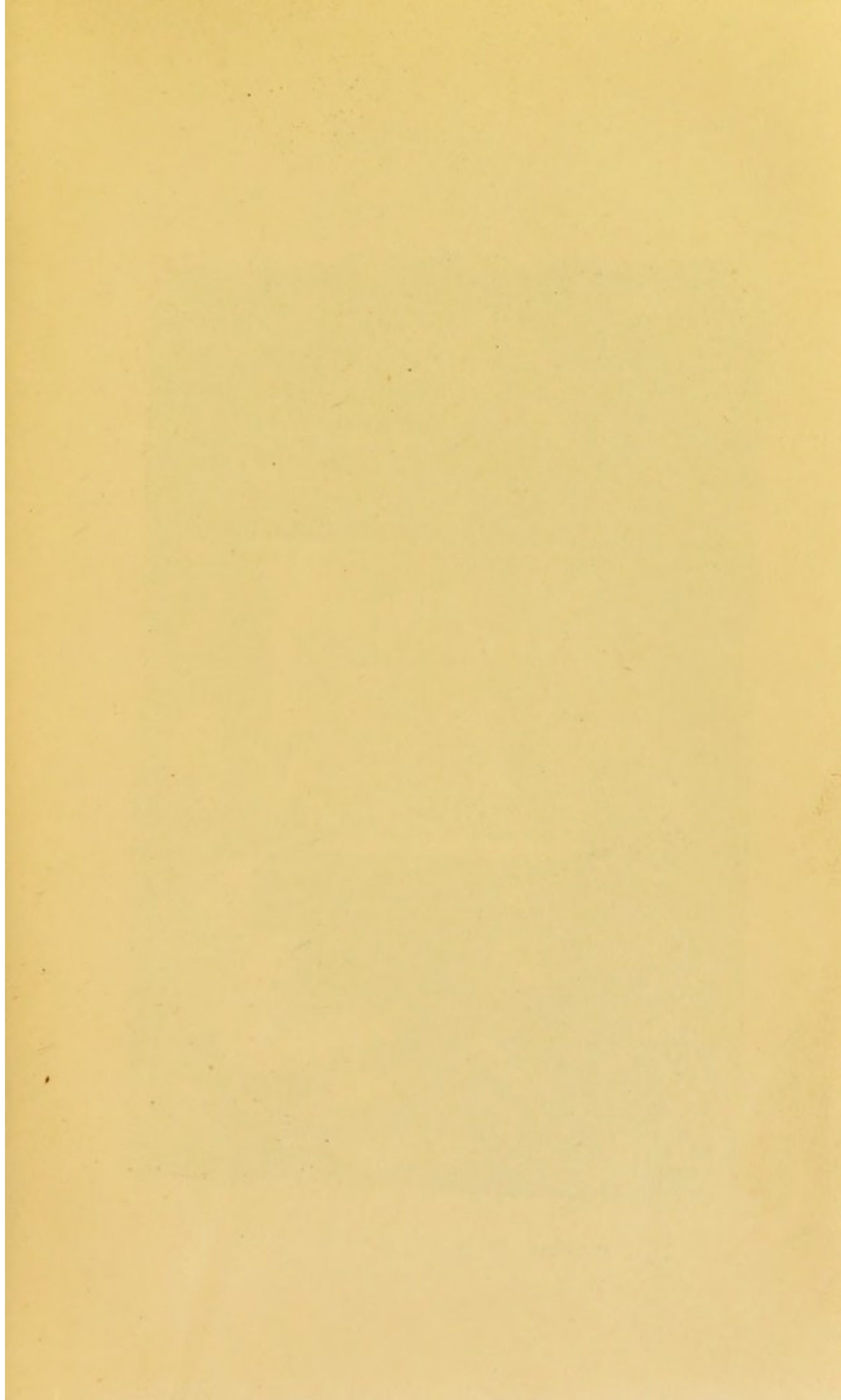
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CLIMATE AND RESOURCES
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THE
CLIMATE AND RESOURCES
OF
MADEIRA,

AS REGARDING CHIEFLY
THE NECESSITIES OF CONSUMPTION AND THE
WELFARE OF INVALIDS.

BY
MICHAEL C. GRABHAM, M.D., F.R.G.S.,
MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON,
ETC. ETC.

"L'espérance du Salut."



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Dedicatória

A SUA Magestade FIDELÍSSIMA O SENHOR
DOM LUIS PRIMEIRO, REI DE PORTUGAL E DOS
ALGARVES,

COM A REAL PERMISSÃO DO MESMO AUGUSTO SENHOR.

SENHOR,

Obedecendo ao sentimento de um dever que me era imperioso, ousei solicitar a graça de dedicar a Vossa Magestade este pequeno opusculo.

Era homenagem devida ás excelsas qualidades de Vossa Magestade, como Homem, e igualmente reverencia á dignidade que na benefica ordem da Providencia Vossa Magestade foi chamado a representar, como Rei, que qualquer tentativa empreendida no intuito de divulgar e derramar pelos povos o conhecimento de uma parte da Monarchia tão importante como a ilha da Madeira, fosse offerecida e dedicada ao Illustre Soberano que, na ordem da successão, representa os nobres Principes a quem o

mundo deve sentimentos de duradoura gratidão pela descoberta desta ilha, e de tantos outros riquissimos territorios.

O benevolo deferimento de Vossa Magestade á minha humilde supplica considero-o eu como um testemunho de immerita consideração, e como um supremo exemplo do espirito de cortezia, que, reflectindo-se do Soberano nos seus subditos da Madeira, determina o meu eterno reconhecimento e a mais profunda gratidão pelo alto favor e privilegio que Vossa Magesta se-dignou conceder-me.

Pereço licença, Senhor, para me assignar,

De Vossa Magestade,

O mais submisso e obediente servo,

MICHAEL C. GRABHAM.

MADEIRA;

1.º de Dezembro de 1869.

(Translation.)

Dedication

TO HIS MOST FAITHFUL MAJESTY

DOM LUIS THE FIRST, KING OF PORTUGAL AND
ALGARVE,

BY HIS MAJESTY'S SPECIAL PERMISSION.

SIRE,

The pleasure of Your Majesty's gracious countenance, in this humble instance, has been sought for reasons alike dutiful and obligatory.

Moreover it is just, both in view of the Person of your Majesty's most Exalted Excellence, and also in reverence of the ancient rule and dignity over which in the beneficent order of Providence, your Majesty has been called to preside, that any effort tending to promulgate a knowledge of the widely important Island, the subject of this volume, should be presented and dedicated to the Illustrious Sovereign who represents, in descent and succession, the

noble Princes to whom the world is indebted for the acquisition of Madeira, as also of many a fair territory.

Your Majesty's condescending acceptance of the accompanying book is, I presume to regard it, a supreme instance of a spirit of courtesy and generous consideration ever prevailing amongst, and characterising all classes of your Majesty's subjects in Madeira; personally cognizant of which, and by high privilege grateful,

I beg to remain,

Sire,

Your Majesty's most obedient
and humble servant,

MICHAEL C. GRABHAM.

MADEIRA;

1st December, 1869.

PREFACE.

THE object of the present work is to render information to those who seek efficient shelter from the viscissitudes of extreme climate.

In view of many existing treatises, and of the excellent and comprehensive 'Guide-Book' of Mr. R. White, the descriptive and social portion has been treated briefly and discursively.

The meteorology has demanded closer attention; and, although popular in aim, is of necessity given in detail. In this section I acknowledge with pleasure the able co-operation of my friend Mr. C. J. Monro, late Fellow of Trinity College, Cambridge, during his occasional residence in Madeira.

The medical chapter is intended as well for patient as physician, technicalities having been as far as possible avoided.

My thanks are due to His Excellency the Visconde d'Andaluz, as also to many others who

have given valuable assistance; and I am especially indebted for access to important sources of information to my relative, Mr. C. R. Blandy.

Lastly and chiefly, for the sketches which adorn these pages, I owe my sincere obligations to Mrs. W. Kemp, whose power of talented and faithful illustration is well known. I regret that the volume is not more worthy of such association.

MADEIRA;

December, 1869.

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THE
CLIMATE AND RESOURCES
OF
MADEIRA.

CHAPTER I.

INTRODUCTION.

MADEIRA has long been known as a safe and valued retreat from the winters of the North, and it is improbable that the climate of any other country will ever be more widely and deeply associated in the public mind with the treatment of pulmonary disorders.

But it is only now possible to realise the two-fold importance of the situation.

In the highway of intercourse between the North and South, the position of Madeira is intermediate between summer and winter. Within a few days'

journey of extreme heat and cold, it presents a neutral ground, upon which refugees from either side may meet and recruit in safety.

Formerly isolated and difficult of access, this island has lately had extended to it the abundant and excellent means of communication by which the present age is characterised, and which the growth of international intercourse and an increasing tide of human migration from country to country have necessitated.

Furthermore, public convenience has been well consulted in the suspension of many irksome restraints on comfortable and rapid travelling; and, foremost among these, the abolition of passports in the more advanced of civilised countries has, in itself, tended to promote general confidence and good feeling.

From the North, Madeira is chiefly sought by those who suffer from pectoral diseases, and also by many who, from motives of precaution, shun the vicissitudes of winter.

Of all these, and especially of the latter, England still supplies the greatest number; but in recent years the Northern States of Germany have been largely represented.

The people of America are debarred, to a great

extent, by a want of direct means of access, though not a few Americans make their way hither by circuitous routes.

It is not too much to say that persons *threatened* with phthisis, who are marked with the general evidence of a consumptive tendency, but in whom the disease is not yet locally manifest, invariably escape after one or two winters in this climate.

In the latter stages of consumption a residence in Madeira is by no means powerless, and by it life is often prolonged and rendered comfortable in the most hopeless cases.

Several efforts have, from time to time, been made by charitable and grateful persons to place the climate of Madeira within reach of a limited number of the poor of England, but with abortive results.

The last project of the kind was commenced a few years ago under the excellent auspices of a late British Consul, and twenty poor men were brought out to Madeira. After the first season, however, the authorities of the Hospital for Consumption at Brompton, with whom the scheme was unfortunately associated, saw fit to secede from the undertaking. The Sanatorium at Madeira, hardly established, was prematurely closed; a large fund of money already subscribed for another winter was scattered and

lost, and, worse than all, an invaluable and rare opportunity for recording authoritatively the worth of climate in the treatment of disease was wantonly and reprehensibly abandoned.

From the South, persons who have recourse to Madeira are, for the most part, those who are prostrated by the deadly fever and dysentery of the western coast of Africa, and it is impossible to overrate the importance this climate derives from its proximity to a district so destructive in its effects upon our fellow-countrymen. The unhealthy season upon the African coast commences in the summer months, and invalids arrive thence at a time when the general accommodation of Madeira is vacated by winter visitors.

The summer of Madeira offers a moderate and pleasant refuge from the excessive temperatures of the torrid zone.

The general reputation of the climate of Madeira was, at the first, founded upon experience, and was fortified in its growth and progress by an extended knowledge of its beneficial effects. Herein the history of this health-resort differs from that of those which, in recent times, have been brought suddenly into prominent, though perhaps transient, notice, inasmuch as the able treatises written upon the

latter have, in many cases, preceded, not followed, public experience.

As to Madeira, I conceive that the zenith of its popularity has yet to be reached, and that the capabilities of the island will only be fully tested when every nook nearer home has been searched in vain for a climate equally favorable. It may doubtless be that the best climate for the treatment of consumption will yet be found elsewhere, or that British winters may be proved to be less unfavorable than we now believe them; hitherto, however, the best accounts from the Mediterranean and elsewhere have tended to confirm me in the confidence which has grown out of six winters at Madeira.

The general advantages of this island we shall consider in detail in subsequent chapters; here they may be broadly stated to consist of resources which supply the necessaries and comforts of life bounteously and without restraint, and minister especially to the exigencies of enfeebled persons; also of a climate characterised by a pleasant and healthful uniformity, which affords direct and valuable benefit by constantly permitting exercise, open-air life, and healthful amusement, and assists the treatment of disease by its remarkable freedom from the exciting causes of irritation and complication.

I propose to give, first, a brief and general account of Madeira and Funchal ; afterwards we may examine separately the features of the climate as evidenced by meteorology, physical geography, and other circumstances. Lastly, we shall consider the medical and hygienic portion of our subject.

CHAPTER II.

DESCRIPTIVE AND HISTORICAL.

MADEIRA is the chief of a small group of islands accounted an integral part of the Kingdom of Portugal in European computation, but whose geographical position in the North Atlantic links them with Africa.

The population of the entire archipelago is stated in recent official returns as 109,047 souls, showing an increase of nearly 6000 in ten years. Of these 1600 persons reside in Porto Santo, and the smaller islands are uninhabited.

Madeira itself is situated nearly 10° north of the tropic of Cancer, in latitude $32^{\circ}43'$; and west of Greenwich, in longitude 17° . The nearest land is a point on the coast of Africa, Cape Cantin, 320 miles eastward; Lisbon is 530 miles distant, and Southampton 1300 miles.

The Madeiras are generally stated to consist of Madeira, Porto Santo, and the three Desertas.

In their relative positions Madeira lies centrally

fifty miles to the south-west of Porto Santo, the three Desertas occupying a position a few miles south and about eight miles east of Madeira. Porto Santo is unseen from Funchal; but the Desertas, which are bold barren-looking rocks, attaining an extreme altitude of about 2000 feet, are conspicuous and beautiful objects.

The Island of Madeira, in shape irregularly quadrangular, is thirty miles in extreme length, and twelve miles in breadth from prominent points. The coast line is little indented; the entire circumference, generally estimated at sixty-five or seventy miles, being formed by precipices of greater or less altitude, and only interrupted where some deep ravine discharges the water of a mountain stream.

The southern slopes are in general less sudden than those on the northern side, but a little to the west of Funchal is to be seen the grand promontory of Cabo Girão, whose vertical face drops into the water from an elevation of nearly 2000 feet. The cliffs of the eastern extremity are the lowest and least precipitous.

Sands there are none, but the shore is a mere stony continuation of the steep declivities to the profound oceanic depths below.

The area, however, is much more considerable than

the foregoing figures would seem to imply, for the land rises immediately and precipitously from the sea to a central altitude of more than 6000 feet, and the general surface is marvellously increased by the extremely broken and undulating character of its convolutions.

A central mountainous ridge occupies the island in its long axis, comparatively unbroken at the eastern and western extremities, and dilating in those regions into elevated table lands, but riven in the centre into several peaks of nearly equal eminence, separated by chasms of profound depth and exceeding grandeur. The mountains are still eroded at their bases by the torrents—tiny streams in summer—which have here so obviously contributed to the general configuration; and the lateral mountain slopes, separated by deep ravines, descend in spurs to form the bold headlands which the coast of Madeira presents on all sides.

The geology of Madeira is uniformly volcanic in character; presenting all the varieties of basalt, both in its crystalline columns and in its scoriaceous and less compact forms, and also of various tufas in foliated beds and in all stages of oxidation and decomposition.

Modern geologists are generally agreed that the

great bulk of the formation has been built up of the eruptive matter of volcanoes in *subaërial* action, and there is also the strongest evidence of the island having been further elevated by the heaving of its foundations in the sea.

Now, a glance at a map in a subsequent part of this book, in which I have attempted to sketch the surroundings of Madeira, will show the extreme depth of the ocean in this region, and how remote are the mere mountain tops which form the Madeira archipelago from the broad oceanic plains below. How, then, shall we estimate the force which once, and, indeed, often and often, ejected the molten lavas from vents so remote, and how can we be assured that the same power is finally quiescent?

The subterranean fires, if still smouldering, give now no evidence of their presence, and, although there remain well-defined craters and cinders which yet retain their first freshness, the water-worn configuration of the island, and the furrows which have deepened to their present aspect under the slowly eroding influences of time and weather, attest sufficiently the remote antiquity of the present surface.

The central and highest mountain peaks of Madeira give the most obvious evidence of the slow disintegrating action which has been there sustained.

These peaks have for the most part maintained their pre-eminence simply by virtue of a nucleus of hard basaltic matter, the superficial mass of softer substance having long since gradually fallen and been washed away.

Yet the history of Madeira, as read by the evidence of its component rocks, teaches that there have been in ancient times very long intervals between the successive outpourings of which the mountains are constituted.

Far down in the clear-cut vertical faces of the coast precipices, matter, which was once at the surface, exposed in its time to atmospheric and sub-aërial disintegration, may now be seen buried beneath the lavas of many succeeding eruptions; and the overlying lavas, in many instances, would seem to have lain exposed similarly during periods of subsequent volcanic cessation, at length to be overwhelmed by fresh outpourings. The periods of cessation have in some cases been undoubtedly long; and, again perhaps and again, during the profound slumber of the disquieting forces, the mantle of life has been spread over the land with all the wonted sumptuousness of nature's display in this climate, until, no longer restrained, the central fires have once more broken through in

overwhelming and desolating violence. Shall we, then, regard the present surface as more enduring than those which have gone before, or rather may we not imagine that at some remote period a scanty evidence of the present epoch may be found submerged beneath the lavas of eruptions yet to come?*

Of deposits other than volcanic may be mentioned two—firstly, some thin beds of limestone, insignificant in extent, and now elevated more than a thousand feet above the sea; and, secondly, a deposit of calcareous sand—the fossil bed—near the eastern extremity of the island. The latter is known as a favorite sea-excursion from Funchal, and the “fossils” are remarkable root-like agglomerations of calcareous matter, devoid of any organic substance in their composition.

What vast periods of time may be involved in the various phases presented by the material structure of Madeira is a problem in which the profoundest speculations of geology are concerned; and, perhaps, our powerlessness in the presence of such considerations may be well measured by the uncertainty with which we are able to speak only of the short period

* In the valley of St. Jorge, on the north side of Madeira, evidence of life in former times, both animal and vegetable, has been found in a carbonaceous deposit 1200 feet beneath the lavas of subsequent eruptions.

to which the chronological history of Madeira is limited.

In reference to the first discovery of Madeira, it is not unreasonable to suppose that the ancients, in their several African explorations, and in their undoubted intercourse with the *Insulæ Fortunatæ*, the Canaries* of modern times, may, not unfrequently, have fallen in with the island group of Madeira, situated at no great distance from the former, and in a line of direct communication with the Mediterranean Straits. It is thought also that the Madeiras are specially designated in accounts which still remain to us of adventurous exploits of navigation when, 3000 years ago, man successfully sought to extend his limits. Such allusions are generally vague and fragmentary, and their significance is veiled by the lapse of many centuries.

Yet such was the magnitude of the maritime undertakings of the ancients that we cannot altogether ignore that which may be interpreted to mean a distinct knowledge of the isles of the Atlantic in very early times. Thus, in the famous expedition of Pharaoh Necho Africa was undoubtedly circumnavigated; and the hired Phynicean sailors

* Canaria, from *canis*, was a name given to an island of the group found to abound with large dogs.

of that king returned to Egypt through the Straits of Gibraltar after setting out by the Red Sea. Moreover, the voyage of Hanno was a reality, and had great results, notwithstanding the gloss of embellishment which tends to discredit it; and in both these voyages certain Atlantic Islands are spoken of. The Canary Islands were certainly known in very early times, and would seem to have been the first substantiation of the old poetical notion that the elysium of the departed was situated beyond the ocean. Hence it has been suggested that those islands were first called the Fortunate Islands. A description of them by Plutarch in his 'Life of Sertorius' would serve generally for this region. "The winds are generally agreeable, and bring with them refreshing showers which fertilise the earth, and make it not only produce anything which is planted, but also supply spontaneously excellent fruit for the abundant nourishment of a happy people who pass their time in the most delicious idleness. The changes of the season are almost always gentle, and the air is pure and wholesome. The north and east winds, which blow from our continent, in travelling so great a space expend their force before they reach those islands. The winds from the south and west sometimes

bring gentle rains, but for the most part only refreshing vapours sufficient to make the ground fertile. All these advantages have established amongst even the barbarians the generally received opinion that these islands contain the 'Elysian Fields,' the abode of happy souls, celebrated by Homer."

The researches of antiquity were, however, neglected and forgotten, and eventually the Atlantic came again to be regarded as the "sea of darkness," the assigned impenetrable boundary of the earth—inhospitable, dreadful, and dangerous to explore. For a recent and laborious investigation of the several steps by which the mysteries of the Atlantic were at length unfolded we are indebted to the learned and illustrious author of 'The Life of Prince Henry of Portugal, surnamed the Navigator,' and to this work I shall have recourse in aid of the present portion of our subject.

In a map of Genoese construction, bearing the date 1351, found in the Laurentian Library at Florence, and published for the first time in 1827, the Madeira group is distinctly represented, and the islands, moreover, bear the identical names by which they are at present known, only that Madeira (Latin; *Materia*), the Portuguese synonym of "wood,"

is in that map called "*Isola dello Legname*," or "Island of Wood." This is the first authentic mention of Madeira in history. The date of discovery is not mentioned, but it is well known that in the early part of the fourteenth century experienced Genoese navigators were often employed in the command of Portuguese vessels. This early knowledge of Madeira nevertheless led to nothing, and appears to have been forgotten soon after the colonisation.

Next in order, chronologically, we have to mention the fortuitous discovery of Madeira by an Englishman named Machin, at an uncertain date towards the close of the same century.

The romance of Machin has always maintained a fair amount of credit at Madeira, though often referred to in doubt; but recently its authenticity has been tested by Mr. Major, who, after examining the sources from which the history has been hitherto drawn, and, moreover, having discovered a document older by half a century than any of these, giving, independently, an account substantially similar, is of opinion that the story must be accepted, and is really true.

The following is Mr. Major's digest, as related by the possessor of the original manuscript account :

“In the reign of Edward III a young man of good family, named Robert Machin, had the misfortune to become enamoured of a young lady, the wealth and rank of whose parents were so far superior to his own that they treated his pretensions with disdain. To avoid his importunities they obtained from the king an order for his imprisonment, and in the interval united their daughter to a nobleman whose station was more suited to maintain the dignity of their family. As the lady, whose name was Anne d’Arfet or Dorset, reciprocated Machin’s affection, he was no sooner released from prison than he determined on carrying her off.

“By the aid of a friend, who contrived to gain admittance as groom into the lady’s family, which was established at Bristol, this plan was finally effected, and from Bristol they set sail together in a vessel which Machin had already provided and manned for the purpose. The intention was to sail for France, but a north-east wind carried them off that coast, and after thirteen days’ driving before a tempest they caught sight of an island, on which they landed. They found it uninhabited, but well wooded and watered, and eminently suited for habitation. For three days they enjoyed the peacefulness of security, and while some explored the

interior, others in the ship examined the contour of the coast, but on the third night were overtaken by a storm and driven on the coast of Africa. The anxiety and suffering which the unhappy lady had undergone found their culmination in this disaster, and after three days of total mental prostration she expired. She was buried at the foot of the altar which had been erected in gratitude on their arrival, and on the fifth day after her death Machin also was found dead on the grave of his mistress. The survivors buried him, and then embarked in the ship's boats, and on reaching the coast of Africa were carried before the king of Marocco, by whom they were thrown into prison. In the same unfortunate circumstances they encountered their missing companions who had previously been carried away in the ship.

“Among their fellow-captives was one Juan de Morales, a native of Seville, a good seaman, and originally a pilot, to whom they gave a description of the land they had discovered. Now, on the 5th of March, 1416, died Don Sancho, the youngest son of King Ferdinand of Aragon, and by his will he left a large sum for the ransom of Christian captives from Marocco. Amongst those who were redeemed was this Juan de Morales, but the vessel

which brought him over was captured by the Portuguese navigator João Gonsalvez Zarco. From pity, however, the latter liberated the unfortunate captives, reserving only Morales, whose experience in nautical matters he thought might be of service to his master, Prince Henry. This Zarco had, as Barros, the historian, states, gone out in company with Tristram Vaz Teixeyra, to explore the west coast of Africa, and had been driven by a storm on the island of Porto Santo. This appears to have occurred at the close of 1418, or at the beginning of 1419. From Morales he heard the account of Machin's discovery, and, with the permission of the prince, and under the guidance of Morales, he set sail, and made the important discovery of the island of Madeira, to one half of which he gave the name of Funchal, and to the other that of Machico."

The latter part of this curious history brings us to the rediscovery of Madeira as generally accepted. Zarco was a famous captain in the service of Prince Henry of Portugal, and his name had become formidable from daring exploits in warfare, and the early use of artillery at sea. In the year following the accidental discovery of Porto Santo, when Prince Henry sent out to colonise that island, the attention of Zarco was drawn to a dark cloud which per-

petually rested upon the water towards the southwest. Acting upon the conjecture of the pilot Morales, that the cloud might conceal an island, though not without the serious and superstitious misgivings of his confederates, he set sail in the direction of the fog, which he found to diminish eastward, and, at length, to lift and reveal the coast-line of Madeira. Guided again by Morales, he found the relics of the Machin party in a valley which was called Machico, and where, at the present day, in a chapel supposed to stand upon the grave of Machin, the cedar wood of a cross believed to have been left by the survivors is still shown with the fullest reverence and confidence in its authenticity.

It is curious to observe how faithfully at the present day the description of the definition of Madeira from Porto Santo yet serves. Almost always from the north, the dark mist is seen to rest upon the land; and, on approaching, the lower heights of the eastern extremity first become distinctly visible, and free from cloud. It is conceivable how easily the outline of the island may for some time have escaped notice from Porto Santo.

The rediscovery of Madeira by Zarco in 1419 was the first step in a period which in all history will be memorable for daring feats of navigation

and for vast discoveries ; and, moreover, also for the persevering enterprise of a people who, occupying a narrow strip of country, under great disadvantages and with limited resources, made conquest after conquest, and continually opened up new lands to the spread of mankind and the advance of civilisation. The Englishman who admires the greatness of the Portuguese in this period of their history may turn with pleasure to the parentage of Prince Henry, under whose auspices, in the face of difficulties, disappointments, and ridicule, the grandest exploits of that period were inaugurated.

Upon the colonisation of Porto Santo Prince Henry appointed to be governor a gentleman of the household of Prince João, one Bartolomeo Perestrello, whose daughter was married at Lisbon to Christopher Columbus. Columbus resided in Portugal from 1470 until 1484, during which period he made several voyages to the Coast of Guinea. "It was during this time," says his biographer, "that the admiral began to surmise that, if the Portuguese had sailed so far south, one might also sail westward, and find new lands in that direction." For some time Columbus and his wife lived at Porto Santo with the widow of Perestrello, who, observing the interest he took in nautical matters, spoke to him of her hus-

band's expeditions, and handed over to him the papers, journals, maps, and nautical instruments left by Perestrello at his death.

"It was not only," says Ferdinand Columbus, "the opinion of certain philosophers, that the greater part of our globe is dry land, that stimulated the admiral; he learned also from many pilots experienced in the western voyages to the Azores and the Island of Madeira facts and signs which convinced him that there was an unknown land towards the west. Martin Vicente, pilot of the King of Portugal, told him that at a distance of 450 leagues from Cape St. Vincent he had taken from the water a piece of wood, sculptured very curiously with an instrument other than iron. This wood had been drawn across by the west wind, which made the sailors believe that certainly there were on that side some islands not yet discovered. Pedro Correa, the admiral's brother-in-law, also told him that near the Island of Madeira he had found a similar piece of sculptured wood, coming from the same direction."

At the present time pieces of timber are often brought to Madeira from western regions during the strong summer flow of the Gulf Stream; and to this current, rather than to the westerly winds formerly thought of, we are to attribute their transit. It is

probable that Columbus frequented Madeira at the time of his residence in Porto Santo, and tradition still assigns the place of his habitation.

We must now return to the narrative of Zarco's discovery. Travelling westward of the Valley of Machico, Zarco and his companions found a small bay and a river in a place now marked by the village of Santa Cruz. Passing further westward a bold promontory—the Brazen Head—they came to the more capacious Bay of Funchal, so named from an abundance of fennel growing upon the beach. After exploring the coast still further, and also the interior, Zarco returned to Lisbon, taking with him specimens of the wood and plants of the newly found island.

He was received by the king with great honour, and the command of the new territory was conceded to him equally with Tristão Vaz, who accompanied him ; but the successful issue of the expedition and the addition of a new and important territory to the kingdom of Portugal went far to silence the opposition manifested at home towards the projects of Prince Henry, and to stimulate in all the desire of further enterprise.

The condition of Madeira at the time of Zarco's discovery gave no evidence of previous colonisation. The island was uninhabited by man, no quadruped

was found, but the undisturbed forests of indigenous species entirely clothed the land. An unpublished ancient manuscript, fragments of which have been translated, gives the following account:—"The Island of Madeira, at the period of its discovery, presented a most lovely picture of nature. A vegetation truly astonishing covered it with indigenous and infructiferous plants, for the most part unknown in Europe, and raised to a prodigious height—the ancient and majestic cedar, the laurel, til, vinhatico, azevinho, aderno, teixo, pão branco, and dragon tree, intermingled with those beautiful shrubs the folhado, faya, urze, myrtle, and uveira, and forming thus one continuous and impenetrable forest. The thicket was carpeted by innumerable and diversified plants, some odoriferous, and others likewise flowering, the arbutus mingling with the herbarea, the fetó, the musgo, and the agarico, in the midst of which rose the silva, the era, the corriola, the allegro campo, and other evergreens and creeping plants, which wove their festoons from branch to branch, and gave new shade to a lovely land all clothed with vegetation, and new force to innumerable springs of pure and salubrious water.

"There was no quadruped whatever on the island, and scarcely an amphibious animal. But over these

silent solitudes soared various birds of prey, and ten different sorts of singing birds warbled their sweet notes. Various species of aquatic fowls had their nests in the huge volcanic rocks which line the shore, and nature showed her affluence in the variety of the insect tribes.”

In the process of colonisation the land is said to have been cleared by the destructive burning of the forests, and an immense conflagration is stated to have lasted for several years. In this manner was the soil fertilised and prepared for cultivation. The sugar-cane was introduced early from Sicily, and a large commerce was soon developed.* The vine was brought a little later from Cyprus, Candia, and elsewhere, but was not cultivated extensively before the middle of the seventeenth century; the north of the island also produced corn and honey abundantly, and thus, in a short time, Madeira became a most valuable and flourishing dependency of Portugal.

The division of the government of the island between Zarco and Tristão Vaz has already been mentioned. The latter appears to have had some uncertain share in Zarco's enterprise, and was made captain-general of one of the two districts into which

* Eventually the sugar-cane was taken to the West Indies from Madeira.

Madeira was at first partitioned. The captaincies were about equal in extent and authority; the northern portion, with Machico for its capital, was given to Tristão Vaz, and the southern portion and the Desertas, with Funchal for the capital, to Zarco. The descendants of the original donatories governed in their respective districts for nearly two centuries, and the lands originally apportioned to their followers still remain, to some extent, in the families of the first emigrants.

The people of Madeira were derived, in the first instance, from Portugal, and the first colonists are said to have been drawn largely from the most noble and eminent families of the mother country. Porto Santo is thought more especially to have retained the lineage of these unmixed, but in Madeira several varieties of race are apparent, and there is strong evidence of African intermingling. Of the people generally I conceive, and the remark may, perhaps, apply to all classes of the Madeira Portuguese, that the men are, if we may in any way venture to compare them with their consorts, more manifestly superior in many qualities and endowments than is often to be observed in a contrast of the sexes. The women have only exceptionally the quickness, grace of carriage, and general animation which are their

special attributes; and, moreover, the undoubted beauty of certain features is obscured by a detracting complexion and by a tendency to stoutness and early maturity. The men, on the other hand, though not especially a fine race, are possessed of average physical qualities; and those of them, the class of work-people, with whom the visitors chiefly have intercourse, are contented and enduring, labouring well and willingly under competent supervision, and having a manner also full of grace and natural politeness.

There is much ground, probably, for a belief that the greatness of Portugal has always been owing in a large measure to the ductility and general qualities of this class of her people, and that the want of native leadership has been long apparent. Nevertheless in Madeira our slight intercourse with the Portuguese people—restricted, as it is, to the class here spoken of—may doubtless impair the general value of our opinions, and it can hardly be denied that all classes of the native people never fail to meet us in a spirit of courtesy which we have done very little to merit.

The Island of Madeira soon appears to have participated in the troubles which from time to time arose to disturb the mother country. Thus, in 1586 or thereabouts, this territory passed into the hands

of the Spanish, when, under Philip II, Spain temporarily absorbed the whole of the Peninsula. The commerce of the island then declined, and the cultivation of the sugar-cane was, for some uncertain reason, soon after partly abandoned. The two captaincies were abolished, and the administration of the two districts was placed under a single governor.

After the re-establishment of the independence of Portugal Madeira was restored; the trade then revived; the vine flourished and was largely cultivated, and in the seventeenth century the island again prospered exceedingly. In 1801 Madeira was held for a short time by the English, and also again in 1807, when the place was surrendered to General Beresford. The British troops finally evacuated Madeira in 1814.

Lastly, Madeira fully shared the civil troubles and commotion which Portugal sustained under the present dynasty prior to the accession of Donna Maria in 1834; since that time no grave question has arisen, but the people have always entered actively into questions of home policy and government, and their authoritative opinion can never fail to have due weight in the councils of Portugal.

In general aspect the face of Madeira cannot have very greatly changed since the resources of the

country were first developed at the period of the colonisation. The forests at first, as we have seen, were destroyed on a very large scale ; but whatever magnitude may be assigned to that immense conflagration,* we are not by any means called upon to believe that the fire spread beyond the space immediately required for cultivation, or that the trees were at that time recklessly and completely destroyed. On the contrary, many years later, the magnificent woods of Madeira were introduced into Portugal in such quantity as to supersede for a time all other kinds ; and subsequently again, the forests of Madeira are known to have contributed to the construction of the ships of the famous Spanish Armada, the dark hard wood of the til tree, yet famous in Madeira, having been cut to adorn the saloons of those magnificent vessels.

The forests of Madeira have been continually receding with the increase of the fuel requirements of an overcrowded population, and the replanting of lands thus laid waste has been long and culpably neglected. Recently, however, the introduction of

* In a famous unpublished manuscript written 169 years after Zarco's discovery, a rare and beautiful copy of which I have been permitted to peruse, the fire is stated to have smouldered irresistibly for seven years amongst the trunks and roots of large trees in the valley of Funchal.

the pine tree has to a very great extent stemmed the progress of a reckless destruction. The pine grows easily and rapidly, occupying lands ill-suited to other kinds of cultivation; the wood is excellent as fuel, and the young trees are used largely in the construction of vine corridors. By-and-by we shall have to inquire how the climate has been influenced by the process of deforesting, more especially because the land has been chiefly denuded in the near vicinity of Funchal, the health-resort of the island; and we shall see, also, what share the pine trees take in the influence of forests upon the humidity of a climate. Meanwhile the spectacle of the newly found country may still, in a great measure, be realised from some of the lofty central heights. The hills and valleys of the north side, still exposed to the moisture of the north-east wind, are yet covered with the ancient dark green foliage, and although there is a notable absence of large trees in frequented regions, it is questionable whether the forests which cover the steep and almost inaccessible slopes of the ravines have ever been disturbed. In the construction of roads the various parts of the island have been rendered only moderately accessible from Funchal, and there exists a general want of repair and good-keeping in outlying districts; yet the roads are

creditable instances of persevering and extended labour, although certainly not models of superior engineering skill. The common disposition of a mountain road is upon the crest of some precipitous spur in a straight line, the severity of most excessive gradients being seldom mitigated by zigzag or circuitous windings. In their nature the roads are ill-adapted to wheel-carriages, and in their imperfect repair and construction often impassable by the sleigh conveyances of the country. In all situations of steepness the ground is paved with wedge-shaped pebbles or flat chips of basalt, but the more horizontal paths among the mountains are merely cut in the rock of the hill-sides.

The angle of incline in some of the ascending mountain roads passes all ordinary conception of steepness and practicability; as, for instance, in the so-called "rocket road" leading out of Funchal, the inclination of which in places exceeds the angle of 26° ! But when the first sense of danger and inconvenience is over, perhaps a certain undefined pleasure and hilarity appertains to the scrambling of these perilous-looking paths, and, moreover, they conduct quickly to the cool air of the mountain regions; the horses also, such is their training and mode of shoeing, travel safely upon them. Invalids, however,

should hesitate to encounter the sudden changes of pressure and temperature implied in this rapid transit, but rather for a time limit their rides to the lesser elevations east and west of Funchal.

For a detailed description of the scenery of Madeira I have little space and very little competency, but, certainly, even less inclination. I recollect perfectly well, when the loveliness of Madeira was first unfolded to me, how little the careful perusal of description had profited, and I may say also that the same view seldom presented itself in the same light twice. It is difficult, also, to point out as worthy of especial notice any one portion of scenery, inasmuch as each has its own unquestioned beauty and distinct power of impressing.

The mountain scenery, however, will be always characterised in the minds of all by the extent in which its grandeur surpasses the conceivable capacity of so small a space ; not that it could be revealed in any extended panoramic view, if that were attainable, for the mountains, though lofty and rugged, are so enravelled together as to present more often a continuity of surface, and an outline apparently unbroken, than the diversified undulations and chasms into which the rocks are incessantly cloven ; but rather the impression is gained in the study of its

details, in the endless windings of mountain paths, in the depth and gloom of countless ravines, in the practical and almost insurmountable distance separating objects apparently close together, and in the uncompromised simplicity of fearful limiting precipices. In the ravines, rich in cultivation, are disposed near the sea-shore the white villages of the people, often literally buried under vine-laden trellises, and the maturity of tropical vegetation. In ascending, the temperature declines, and the climate becomes more temperate in character. Eventually summits are reached where the frost, snows, and winds of winter reign in their variable inclemency; and all these changes are included in a space which measures horizontally only six miles.

No extensive knowledge of the scenery of Madeira is commonly obtained during a winter's sojourn, and they are comparatively few who travel into the mountains far beyond the district of Funchal. There are some points, however, which are frequently visited, and therefore demand a passing notice.

The *Grand Curral* is one of these: a deep, capacious gap situated amongst the central mountains at a distance of three hours' journey from Funchal. The road to the western side of the Curral passes in steep ascent through the famous *Estreito* vineyards,

and beyond, in a district wooded with Spanish chest-nut trees. At length, when the country has become almost uninteresting, at an altitude of about 4000 feet, the Curral suddenly opens on ascending a steep, grassy slope, revealing, as it were, in one view the meeting point of the ravines in their greatest magnificence. The precipitous walls of the chasm have an average drop of about 2000 feet; the rocky peaks of the highest mountains are ranged round about; and in the depth of the gorge upon a table of cultivated land nestles a little village with its parish church and cottages, all seen in miniature from above. The Curral may be also viewed from the eastern side, which view is distant a two hours' ride from Funchal. The road is taken for a great distance along the brink of deep valleys, which, being in themselves very beautiful, detract from that magical effect of suddenness which the opening of the grand ravine on the western side produces.

An admirable specimen of the same kind of scenery is to be found immediately above Funchal at an elevation of 2000 feet, a distance of about three quarters of an hour on horseback, where, also, a magnificent ravine is suddenly encountered; and this is called, not inappropriately, the Little Curral.

The scenery of the *Ribeiro Frio* and *Lamaçeiros* is

of a different order, inasmuch as the mountain slopes are completely clothed with wood, and the sea is an important feature. In the minds of many the last-named of these two takes precedence over all others. The Lamaçeiros view is taken at a point in a mountain pass between the north and south sides of Madeira; above, every hill is densely wooded; and below, the rapid slopes converge to form a spacious basin opening toward the sea, the rocky coast of which is here interrupted. The basin is subdivided by a gigantic rock whose vertical face measures 1900 feet in height. The sea is often apparently continuous with the sky, the horizon being only faintly marked by a light purple haze, and the shore is perpetually fringed with the white surf in which the blue water foams against the stony beach. The Lamaçeiros is distant three and a half hours from Funchal.

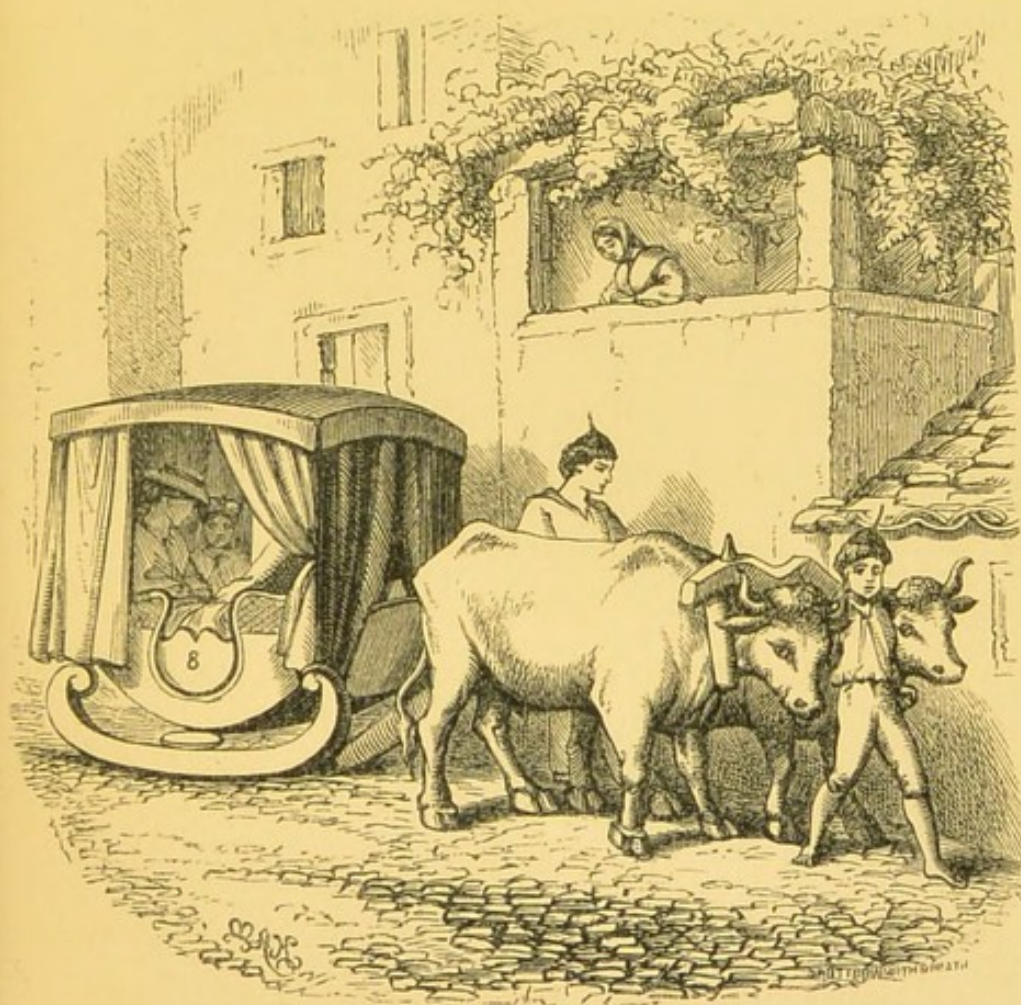
The chief summer resorts of invalids are stationed in mountain districts around the basin of Funchal. *Camacha* has in recent years been most generally frequented, and from thence the most charming scenery of the eastern side is easily accessible. *The Mount* in the central and upper part of the valley of Funchal is occupied chiefly by those whose business requires them to be near the city.

The *Jardim da Serra* has of late supplied an excellent but limited accommodation in the region of the *Grand Curral*. Lower down, the hills west of Funchal enjoy excellent summer climates, though of late years they have been neglected and the accommodation has not been well maintained.

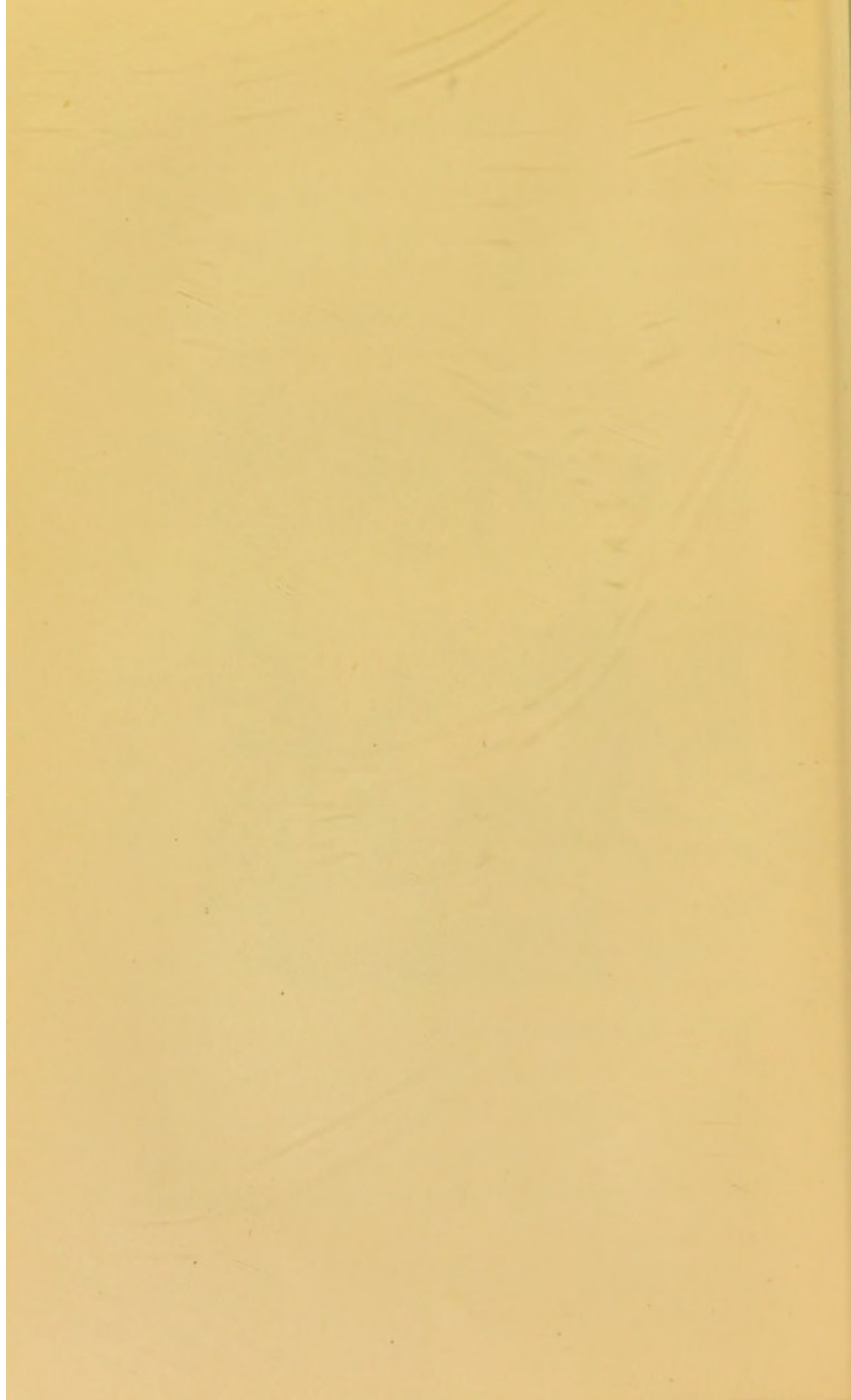
The northern slopes of the island and those, perhaps, more particularly, of the district of St. Anna, are pleasantly open to the fresh breezes of the summer trade-wind, and are resorted to with much advantage.

On the whole it is always better in the summer, as in the winter, that an invalid should settle quietly down in some well-selected district, and avoiding the fatigue of excessive journeys, content himself in exhausting, if that be possible, the variety of scenery immediately around.

The habitations of the people of Madeira are generally clustered together in valleys and other sheltered localities, and many of their settlements lie along the sea-shore. Few of them require individual notice, although some apparently insignificant are endowed with municipal rights and privileges. Sta. Cruz, however, deserves exceptional mention; that village lies on the coast eastward of Funchal, beyond the protecting heights of the city, upon



THE BULLOCK-CAR.



southern slopes of less precipitous inclination. Thither, invalids whose condition may debar them the bracing air of the higher ground, may proceed by sea, and enjoy in a well-selected opportunity the uncloying breezes of a more exposed situation. Sta. Cruz is generally frequented in the spring months.

CHAPTER III.

FUNCHAL AND THE SOCIAL ASPECT OF MADEIRA.

FUNCHAL, the capital of Madeira, is situated upon the south side of the island, in a place where the continuity of a generally precipitous coast is broken by the concurrence of three important mountain streams. The bay is formed by a small inflection of the coast line; and from the stony beach, steep acclivities radiate to enclose a deep and spacious amphitheatre.

The protecting heights behind present an average altitude of 4000 feet, and the east and west are bounded by ponderous abutments from the central range. The hills on two sides rise immediately and steeply from the shore, but on the western side a space of ground comparatively level intervenes between the town and the limiting elevations beyond. The Bay is open to the south and partly, also, to the east and west; but the north, north-east, and north-west are shut out by the heights above mentioned.

The space thus tersely described possesses in the winter months what is known as the climate of Madeira, the elements of which we shall presently examine. Beyond the vault of Funchal, a certain freedom of sway is accorded to the vicissitudes of climate, but the forbearance of the seasons has never been withdrawn from the region under consideration.

It is here that persons who seek shelter from the winters of the North and the summers of the South, pass the period of their sojourn in Madeira. How a space apparently so small can minister for many months to the well-being and pleasure of its guests we must now proceed to inquire.

The district of Funchal, a city third in importance in the kingdom of Portugal, is inhabited by 30,000 persons, whose white turreted houses and churches are massed together upon the sea-shore, and upon the terraced slopes of the surrounding mountains. The town itself is not beautiful, either in special features or in general arrangement, but it is essentially foreign looking; and, moreover, unlike in appearance the foreign and familiar cities of the continent of Europe. The distant aspect, however, is charming from any point, and the various views around Funchal are largely charac-

terised by the beautiful and fresh appearance of the city, shining in its white houses and churches upon the purple cliffs, and the dark blue water of the ocean, amidst a surrounding luxuriance of vegetation.

The streets of the town are marked by little variety or animation; there are no wheel carriages, few notable shops or public attractions, and the fashionable of the Portuguese people do not habitually appear out of doors. The principal of the streets run transversely to the ascending slopes of the mountains, and are, therefore, fairly level; all are narrow, cleanly kept, and well lighted, and are paved throughout with the small pebbles and chips of stone spoken of in the last chapter. Side-pavements there are none, but the convenience of pedestrians has been consulted in a regulation which prohibits furious riding within the town. The pebbles, however, are not comfortable to unaccustomed feet, and inasmuch as the whole city is thus paved the hindrance to walking exercise is seriously felt. In the town of Messina I remember the reverse of this arrangement in streets which were entirely covered with large smooth flag-stones, to the convenience and inconvenience of man and beast respectively.

The public walks of Madeira are all situated near

the sea, planted with trees either evergreen by nature, or whose deciduous foliage never entirely fails in this climate. The most popular lounge, the Praça Constituição, faces the cathedral in the centre of the town, and is furnished with comfortable seats; in this space, upon a certain day, a military band usually performs throughout the winter to a large concourse of people.

The banks of the rivers, as also the entrance from the beach, are shaded likewise with magnificent plane trees; but in this instance the climate of Madeira is powerless to annul a natural period of winter torpor, and the leaves are regularly shed in the autumn.

The houses of Funchal are, for the most part, built upon a space of ground sufficient to provide all necessary accommodation in one or two stories, and the ground floor is generally and wisely uninhabited. In town the basement is occupied by a shop or wine store; in the country by the offices and servants' rooms. The space of the upper part is too often sacrificed to one or two lofty and grand reception rooms, whilst the bed-rooms are small and insufficiently considered. Thus, in the English Club—a building which may well illustrate the style of almost all the older houses—the large

rooms are superb in dimensions and decorations, whilst the smaller are something less attractive than the back rooms in a crowded part of London.

Our forefathers seem to have forgotten that we occupy our bed-rooms for hours consecutively, our sitting-rooms for minutes fitfully; and here this is the more remarkable, inasmuch as in Madeira the day is greatly spent in the open air. In this climate every one should see to his bed-room.

In the boarding-houses for the most part, and in the *Quintas*, or country-houses occupied by visitors, the comforts and requirements of invalids have been well understood and provided for. The bed-rooms are spacious, lofty, and sunny, and the ceilings are always domed, and in some cases handsomely traced. Fireplaces have of late been very properly introduced, for the sake rather of ventilation and the accidents of special need than of insufficient temperature. In external aspect the houses are almost all white, having green Venetian blinds, French windows, and balconies, and are built of stone and wood-work, in the solid and substantial manner for which the Portuguese are famous.

The public buildings of the city have neither architectural merit nor historical interest to detain

us; and, indeed, generally speaking, we may say that the unusual profusion of nature in this country has to compensate to a great extent for lack of art.

The Custom House standing upon the beach is a fine specimen of the few old buildings remaining scattered about the island; and it is generally the first of these with which visitors become acquainted. The exterior is in no way remarkable; but some of the large store-rooms within contain a few pointed arches and carved capitals. No invalid need be troubled about the Custom House on arrival. He may safely deliver his keys to the hotelkeeper to whom he entrusts himself, and all will be well managed. Personal luggage is seldom or never subjected to superfluous scrutiny, though in respect of packages, which pay freight, the delay and the cumbrous formalities which are thought necessary often tempt one to inquire whether the revenue derived from the institution suffices for its working expenses, and whether the prosperity of the country would not be better consulted by the abolition of unprofitable restrictions.

Adjoining the Custom House are various offices for the transaction of public business. The Municipal Library is also kept here, containing a few old

manuscripts, and many standard national works; the room is not much frequented, although open daily during certain hours for general access.

Also near the Custom House, stands the prison, with a military guard. The wretched place is a sort of authorised begging-house; the daily bread of the inmates having to be earned in part by the cramped pursuits of ordinary avocations, and also by the alms received through the bars of a vile habitation. It might be supposed from the constant display of baskets and combs that the manufacture of these articles had some demoralising tendency; but it is more likely that these trades are easily taught and learnt during incarceration. A general sense of security in this country is a matter of great public comfort; one may travel without apprehension alone into the remotest mountain glens, and at home, house-breaking, and the graver offences are seldom heard of. The dishonesty of the people manifests itself rather in minor acts of peculation, and in an admirable facility of evasion and lying.

The General Post Office stands on the eastern side of the College Church, and its defective arrangements are, in a great measure, compensated by the civility of its officials.

The Palace or Castle of the Governors standing

upon the sea-shore, westward of the landing-place, contains a few spacious rooms, some of which are adorned with the quaint portraits of early dignitaries. Within the grounds, a meteorological Observatory has been erected, and the reports are regularly printed at Lisbon. Beneath the Castle on the south side, issues a spring of pure water,—the best source of drinking-water,—whose temperature is little altered by the seasons, and whose quantity is unaffected by torrents of winter rain, and months of summer drought. The Government is conducted by separate civil and military delegates from Lisbon, and the Palace is occupied conjointly by their Excellencies. His Excellency the Marquis of Cezimbra, is now the Civil Governor, but the Military office is vacant.

The Island is divided into nine *concelhos* or districts, each administered by a *Camara*, or municipal body of its own. Each *Camara* contains a delegate of the Civil Governor, and the Members are popularly elected by persons qualified by a yearly income of £20. In the Cortes at Lisbon, the Madeiras are represented by two Deputies, elected by ballot under a similar qualification.

The military garrison—a battalion of soldiers—is quartered in a block of buildings of which the College Church is the prominent feature.

The General Hospital—the *Santa Casa de Misericórdia* was erected in 1685 and occupies the north side of the Praça da Constituição ; a medical school is attached, and lately some new wards containing modern appliances have been added.

The building is now devoted only to the small number of forty or fifty patients, but the space if fully occupied might accommodate many more. Nominally rich, but with unsatisfactory finances, the resources of the institution are not fully available ; nevertheless the necessities of the sick people are to a certain extent well and ably met.

A more magnificent hospital stands in a beautiful garden near the Municipal Cemetery on the western side of Funchal. This was built some years ago for cases of phthisis occurring amongst the natives of Brazil, Madeira or Portugal, by the Empress Dowager of Brazil ; the wards are lofty, small, well-ventilated and comfortable. Unfortunately, the building is unused, owing to some disappointment in the wishes of the Empress. The hospital is open on certain days to public inspection, and is well worth a visit.

In the same region is situated a small hospital for lepers, for whose maintenance the public funds provide.

The Poor House—*Asylo de Mendicidade*—near the hospital of the Empress, represents in its inadequate accommodation and resources the pressing need of a more general relief for the sick, destitute, and aged of an over-crowded population.

Begging is a general and almost natural habit among the poor, and there are few cases amongst the ill-fed, ill-housed, ill-clothed multitude of pure imposture. Visitors, however, should refrain from partial and indiscriminate charity, but rather strengthen the hands of those whose knowledge and opportunities enable them to administer discreetly and impartially. The English Church offertory has for many years been made a channel of relief to the poor and needy of Madeira with some advantage; but it is questionable whether the successive chaplains have been able to discern the real merits of apparent necessity. The need of voluntary assistance, however, may be tersely stated to consist in the absence of poor-rates or government provision.

Lastly, besides the Military Hospital, the surplus funds of a defunct institution have been invested jointly with the British Consul and the Chaplain, to be applied to the relief of casual destitution amongst British seamen.

The parish churches of Madeira need no lengthy

separate description. They are four in number; viz., the Sé, São Pedro, Sta. Luzia, and Sta. Maria Maior: and there are also several important churches and chapels attached to various houses and establishments. With the exception of the first they are built in a kind of Italian style coped with grey basalt and carefully whitewashed.

The Sé—the Cathedral—stands near the most frequented public walk, and contains in its tower the only public clock in the city.* The church was built early in the sixteenth century, and presents a pointed doorway and other features upon which the eye lingers in the general absence of Gothic. The large square tower is surmounted by a spire covered with glazed tiles; the bells are hung visibly in the window niches of the belfry; and the summit is decorated with a globe, an emblem once in common use, and significant of the vast discoveries of the Portuguese in former times. The interior of the cathedral is notable chiefly for a decorated roof of native cedar, and though the altars, pictures, and images are poor, the special decorations are effective and full of taste.

The churches of the remaining parishes are con-

* I believe the clock is regulated by a Dipleidoscope, and perhaps the equation of time is sometimes irregularly applied.

structed upon one very simple pattern, and have no attractions for sight-seers; their greatest defect always appears to me to consist in the absence of windows in their plain, lofty, white walls, and this character is perhaps incidental to the style of architecture; yet inside there is so much to venerate that the arrangement may also assist to concentrate attention.

The Church of the Jesuit College, recently repaired and decorated, has to show some admirable specimens of Madeira wood-work, and profuse ornamentation. The front of that church is adorned with the statues of illustrious Jesuit saints.

The church bells are seldom silent; many of them are really excellent in cast and mode of hanging, and their foundation notes are given out without the undue prominence of harmonics so often heard in some of our best bells at home. There is, however, no such thing as a tuned peal, and without coming to Madeira I think it impossible to conceive what inharmonious confusion can be got out of bells, and this notwithstanding that in Lisbon the chiming is full of taste and music.

The Roman Catholic Faith is the State religion of Portugal, and there are perhaps few countries where its teaching is more heartily accepted than in



Madeira. The people are at least never suffered to forget their religion, and whatever further effect its complete and complex ritual may have upon them, they all go to mass as a matter of course; they know every saint's day, and the virtues of every saint; the meaning of every bell, and the time and manner of every observance. The people of Madeira have at least the form of their religion, and who can say that the masses of our own people in England have in any greater degree the substance of theirs? The religious processions of the various seasons are in themselves not remarkable as mere sights, though to the people they are important in point of devotion and scriptural illustration, but the taste with which the streets are decorated may be observed with pleasure, and anywhere but in Madeira one might pause at the altars for the sake of their floral ornamentation.

A great religious luxury amongst the people is a sermon, and from any distance will they come to sob and moan over the passionate declamation which is usual. One may be tempted to think that such a people would be more at home in certain outlying suburbs of London, where every shop announces "for Sunday next (D. V.) two sermons," &c. &c.; but the fact is, that preaching is seldom appended to

the mass in this place, and it may be for that reason occasionally the more effective. The adoration of images, as here practised, and the attribution of different virtues to different representations of the same saint, can mean nothing more or less than idolatry pure and simple.

The English reformed faith is now permitted in Portugal to be practised unostentatiously by the reciprocal clauses of an international treaty. The British Chapel stands near the upper end of a principal street, the Carreira, in a garden of lovely trees and flowers. The building, a model of neatness and comfort, was successfully designed at a wasteful expenditure to comply with a requisition to abstain from ecclesiastical pretensions. The sum of about £10,000 was spent upon this curious structure, and after standing about forty years the foundations have in some part recently given way.

The British Chaplaincy is governed by a British Act of Parliament, and is supported by the large majority of English visitors and residents. The chaplain is nominated by the Madeira people, appointed by the Crown, and licensed by the Bishop of London.

It may be hoped that ere long the services of the British Chapel may be better adapted to the capa-

city and endurance of those who so largely form its congregation. Physically speaking, church-going is not always the best thing for invalids, and there is every reason why the church should in the present case conform to their requirements. Few enfeebled persons can bear without undue fatigue the enforced and protracted postures of the long Morning Service.

A handsome but somewhat dilapidated old Council Chamber has also for many years been used as a church, though without much support, by a section of the British community. The building is one of the few Gothic remnants of former times, and the ancient beauty of the cedar roof is still apparent with the remains of coloured decoration. A few years ago the short services of this chapel were much sought after.

Lastly the Presbyterians have built a very pretty little structure with a high-pitched roof and other Gothic characters in a central position near one of the fruit markets. The proper denomination is, I believe, Free Church, but the establishment ministers comprehensively both to the diverse persuasions of Protestant dissent and to its own special adherents.

The Germans often hold, moreover, a Lutheran service in some convenient house with accommodation necessary to their casual requirements.

The convents of Madeira have long ago been disestablished and disendowed, and the complete secularisation of their property is only deferred during the life-time of a few nuns. Two of these communities occupy prominent positions, and their buildings are extremely dilapidated in appearance. The Convent of Sta. Clara, the most ancient, was built upon the site of a structure founded by Zarco himself. The nuns, now few in number, still to some extent maintain an ancient reputation for the manufacture of feather flowers and confectionery, and something more let us hope.

The Encarnação Convent was built and endowed by a private individual, and both it and Sta. Clara formerly possessed means adequate to their support ; they are both of the Franciscan order. Close to Sta. Clara is situated another convent, the Merces, a Capuchin establishment still fairly tenanted, and to some extent kept in repair. The Bom Jesus and the Convent of St. Isabel have already been applied to secondary purposes, viz., the care of widows, orphans, and others who have sought the refuge of their walls.

The monasteries have entirely disappeared. The brotherhoods at the present time merely survive as relics of former importance and as societies con-

nected with some of the religious establishments; their dress distinguishes them, and their principal duty appears to consist in taking part in processions, and attending the Host whenever it is taken into the streets. Lastly St. James-the-Less is the Patron-saint of the Island; and official homage is annually paid to him at his shrine in grateful memory of his powerful intercession during the ravages of an ancient pestilence.

West of Funchal, opposite the Hospital of the Empress, the Portuguese general cemetery prominently occupies a most charming situation upon the verge of a lofty cliff. The walks are planted with cypress trees, the ground is covered with a luxurious and uncurbed vegetation, and the view from the ground is on all sides very beautiful; but the tombs are not in any way remarkable, and, moreover, in many cases lack care and neatness. The English burial-ground, devoted also to the general interment of Christians other than Roman Catholic, is situated near the British Chapel in a garden whose condition is a model of culture and attention. No extensive view is boasted, and the heavy bastions of the Peak Fort which overhang the ground contribute to an unbroken seclusion. This is the prettiest, and in some respects the saddest, of cemeteries; but we

may remember in the wreck of youth, hope, and promise which lies below, that if the germ of virtue has in many cases perished, time has not sufficed for disappointment, degradation, or decay. It may be perhaps that—

“The good die first ;
And they whose hearts are dry as summer dust,
Burn to the socket.”

The tiny cypress-planted plot close by is the residents' cemetery, now no longer used for interment.

Let us turn now to the general society of Funchal. Of the 30,000 persons who reside in the district of Funchal less than 200 are English ; formerly the number was greater, but the circle is yet large enough to maintain itself distinctly amongst the foreign population with which it is interwoven. The existence of a general society composed of the few elements presented by a gross number so small is saved from a stagnation common to small English communities, partly by the continual ebb and flow of a tide-wave of visitors, and partly by the closeness of relationship which binds together the main branches of the Madeira family. The heads of various families are associated largely by ties of blood and marriage, and their children, reared as it

were in one common nursery, have carried into manhood the familiarity of intercourse which only brothers and sisters maintain in after life. To these the outer world is represented by the stream of changing visitors, and their transient association with strangers serves rather to cement than annul the closer intercommunion just noticed.

Formerly, in their unblighted prosperity, the merchants of Funchal were numerous and affluent; and the hospitality of their splendid establishments was freely and generously devoted to the comfort and convenience of their winter guests. Moreover, it must be said that the same attentive politeness and kindness of hospitality still prevail amongst the few who remain; and one might dwell long and deeply upon the spirit of disinterested and unvarying geniality with which the English residents are wont to greet their fellow-countrymen in exile.

The tone of society, often temporarily swayed by the character of a given annual influx, has doubtless been greatly leavened by continual contact with a class needing care and tenderness, and by a necessary participation in the natural restrictions of enfeebled persons. In Madeira an invalid is seldom or never debarred by infirmity from mixing in general society; and society has conformed itself

imperceptibly to the limits of his abilities. Social distinctions, it is perhaps necessary to say, are hardly possible in a community occupied almost entirely in one narrow commerce; and the fine gradations of a uniform respectability can be drawn only by feeble lines of demarcation.

Social life in Madeira is very English in character, or rather what life would be in England if there it were always summer, with abundance of luxuries and plenty of idle people to enjoy them. Public amusements there are few; besides the military band nothing more than an occasional public ball; no theatre or evening performance worthy of mention. As regards invalids, this latter want is not unfortunate, and may save many an aggravation of a malady.

Private entertaining is marked by an enduring succession of dinners, luncheons, croquet parties, and pic-nics, interspersed occasionally with balls, music, &c. Those who are strong may, if they so wish, be thus occupied throughout the winter without interruption. During the season of Lent the wording of invitations has to be modified; but one may still indulge in fleshly hospitalities with the *granum salis* of "only two or three you know," and "quite amongst ourselves."

Croquet parties are very frequently given, most of the houses and boarding-houses having croquet grounds ; and perhaps this variety, of all other entertainments, affords the most convenient and pleasant mode of gathering in this country. One may thus come and go at pleasure, meet one's friends, and loiter and enjoy the open-air and social intercourse without undue restraint or fatigue.

Invalids are not expected to assist at evening parties, and they will do well also as a rule to avoid the sumptuous and protracted luncheons which are even yet fashionable ; nothing should be allowed to interfere with the afternoon ride or the accustomed variety of open-air exercise, and it is unnecessary to say anything about the atmosphere of crowded and heated rooms.

Life in Madeira is essentially spent out of doors by all classes. Amongst the Portuguese, many hours of indolent leisure are innocently passed in the simple occupation of watching the streets from their balconies, and this habit is preferred both by men and women to walking abroad, or even lounging in the public resorts.

Perhaps one of the most pleasurable characteristics of Madeira life is to be found in a climate which permits and encourages sitting out ; the temperature

is generally warm enough for the most susceptible persons, and there is no season in the year in which it is impracticable. In the streets themselves, beyond the general quaintness of things, there is little or nothing to amuse or to occupy attention; and in their own public entertainments the people are satisfied with performances only nearly equal to those generally found in our own small provincial towns.

The society of the Portuguese people is hardly to be cultivated during a short stay in Madeira, and, commonly one's opportunities of observing the national character are confined to the domestic and general servants. The causes which tend to keep us asunder are many. Our languages are mutually unknown, our habits are different, whether of abstraction or business, and English people are deficient in many of the social attributes of a southern people.

The education of the Portuguese is to some considerable extent cared for by the Government, schools having been established in several districts. Amongst the English, tuition is undertaken by one or two permanent residents, and the community is, further, never without the valuable assistance of competent persons who may chance to winter in Madeira. For the last few years, Dr. Sattler has ably under-

taken various branches of instruction, and in music perhaps especially his accomplished teaching has wrought beneficially.

The Portuguese of Madeira are not a musical people. Their musical condition reminds one much of what Mendelssohn found amongst the Italians ; nor is it, I think, much better in Lisbon. The favourite national instrument is the "machette," related to the Spanish guitar, both in size and quality of tone, as the "kit" of a dancing-master to a violin. But the machette is capable of great things, and, moreover, it is really pleasing as played in the streets by almost every peasant.

Of the principal clubs of Funchal, the *Club Funchalese* stands near the Post Office, and contains a large suite of handsome rooms. The reading-room is stocked with various foreign newspapers, and the house also contains a good English billiard-table. The subscription is moderate and admission is freely accorded. The English Club, a general place of resort during the winter season, occupies a charming situation upon the beach, giving an excellent view of the bay and shipping. It has a large library, from which books may be taken, and most of the English magazines and newspapers are regularly supplied. Here also there is a good English billiard table.

The lower part of the Club House is occupied by the offices of Mr. G. H. Hayward, H.B.M. Consul.

At the end of the same street the Commercial Rooms—though, I believe, lately altered in constitution—are yet much frequented, and late newspapers and intelligence may be often found there.

Temporary residence at Madeira is abundantly provided in the numerous furnished houses (Quintas) of Funchal, and also in the boarding-houses. Passing mention has already been made of the former. Their furniture is generally not sumptuous, but comprises all the essentials of comfortable living, and not a few luxuries. It is only necessary to bring plate and linen. Servants may be readily hired who speak English intelligibly, and who understand the common requirements of English people. English servants are too often disappointing; they are almost always useless on the voyage, strange to the customs of a new country, and, moreover, they seldom improve during the enforced idleness of a Madeira season. A list of houses available for hire, and much other miscellaneous information, may be had of Mr. J. Payne, who has for many years given various and useful assistance.

Houses are generally let for the season, their rents ranging between £40 and £200, but there are one

or two on a scale of greater magnificence which are occasionally rented for very large sums. The same rent is often asked for the season as for the entire year, and in view of possible contingencies it is well to hire for the longer period. A tenement, unless by special stipulation, generally comprises the house and flower garden, with liberty to use the walks and terraces of the entire Quintal, the landlord usually reserving the produce of the ground.

Many of the Quintas are very pretty and charmingly situated, overlooking the sea and the city from various points and altitudes, and standing in the midst of their own sunny gardens and vineyards. Almost every house in Funchal has its small garden-plot, and the common condition is more generally one of luxuriant overgrowth than of neat keeping, so rampant and intractable is vegetation. The banana and many unusual tropical forms abound everywhere; and a display of gorgeous creepers, chiefly of roses, bignonias, and bougainvilleas, all mingled together and lining the walls and trellises in a climate which favours their most complete development, is, perhaps, of all others the most striking feature of Madeira gardening.

The garden of the Vigia may be specially named as illustrating what care and good taste may do. In

this lovely place one may walk and wonder; the flower-beds are spread uninterruptedly with the magnificence of the four seasons, and in bewildering association the characteristic plants of remote and widely-separated countries and different climates harmonise and thrive on neutral ground. The house in the midst has likewise borrowed from the luxury and comfort of many countries; and the Mirante upon the edge of a lofty cliff is perhaps, both in itself and in its charming situation, the most fascinating attraction of the place. The Vigia has sometimes been let in the absence of Mr. Davies. Quintas* are, as a rule, more appropriate to families, especially where there are many children. But the generous living and comforts of the boarding-houses are to be preferred for invalids to the daily troubles and anxieties of housekeeping. No invalid before finally taking up his abode for the season, whether in a boarding-house or furnished Quinta, should neglect to consult his friends respecting the character of situation, nature of agreement, &c.

The boarding-house keepers or their repre-

* Of houses which may sometimes be hired by visitors, I may mention as above the average, the Quinta das Angustias, near the Vigia; and also a charming villa recently built further westward by Dr. Pitta.

sentatives invariably attend the arrival of vessels, and passengers who are not specially recommended may select indifferently. The chief houses are all well kept, and the general necessities and comforts are well provided for. The terms are fifty dollars per month (about £10), exclusive of a few extras. The houses which make a lower charge are of another class. Persons, moreover, who propose to occupy hotel rooms only for a short time at the commencement of the winter season do so often to the exclusion of more permanent tenants, and may, therefore, expect to be subject to a higher rate. In all these houses a table d'hôte is provided, and the general convenience is considered in the disposal of hours. There is always a public drawing-room; and suites of private apartments may be also taken.

The markets of Funchal have of late been somewhat heavily taxed to meet the requirements of a greatly increased shipping, and prices have in some measure advanced. Thus, a few years ago a good fowl could always be bought for 10*d.* or a 1*s.*; whereas now, about 1*s.* 3*d.* has to be paid. Likewise the price of beef has been raised to about 4½*d.* or 5*d.* per pound. The resources of the island are, however, ample to meet any probable demand, and it is likely that a better and more various supply

will be stimulated by the recent encouragement to producers.

Beef is excellent, and always to be had; mutton is generally small, and often ill-fed; but the fattening of sheep has lately received much attention. Veal and mutton, both abundant, are generally to be bought in the market only on certain days of the week. Poultry of many kinds is plentiful in all seasons, and Madeira is a land of eggs, milk, and fresh butter.

The deep sea of Madeira affords few of the familiar species found upon our own coasts; and one misses the most common and most tasty of our customary flatfish. The fish-market of Funchal, a model of cleanly arrangement, is well worth a visit for a sight of the monstrous and hideous creatures which the waters here yield. Red mullet is abundant and excellent, and there are other very edible varieties whose names can afford little or no information to the general reader.

Vegetables are continually to be met with in a quantity and variety which set at nought all customary reckoning of time and season. The summer is marked by a profusion of fruits which are familiar in northern climates, and the winter fruits include many kinds common to tropical countries, namely,

the banana, custard-apple, mango, guava, and many others.

Of game, the red-legged partridge is frequently to be seen, though too often ruthlessly destroyed in the breeding season. There are no pheasants or hares; woodcock, snipe, and woodpigeon appear now and then.

All foreign produce may be obtained at very reasonable prices from the various shops of Funchal; and there are few necessities of life which need encumber the invalid in his outward journey. I may mention also that steamers in their rapid passages and ice-houses offer admirable means for the regular conveyance of game, oysters, and other perishable luxuries.

The expense of living in this island as estimated by cost of mere sustenance would, in comparison with most places, appear very moderate; but a true contrast of Madeira life in this respect with residence at many well-known health resorts would involve the difficulty of setting the value of numberless unbought comforts and luxuries against mere costly sustenance.

In another chapter we shall notice the means of locomotion and exercise used in Madeira. Horses are supplied by Mr. Sutcliffe, and from several

stables; each is attended by a groom (burroquero), who accompanies on foot for any distance, and, with the assistance of the tail of the animal, at any pace. It is generally found convenient to hire by the month in order that the same horse may be always at one's sole disposal. The usual contract price is thirty dollars, but horses may be hired by the hour for 1s. 3d., with a gratuity of 5d. for the "burroquero."

The hammock, hereafter to be noticed, costs eighteen dollars per month, or 1s. 3d. per hour.

The bullock-car is also charged at 1s. 3d. per hour, or a monthly agreement may be made.

On all these matters and their variable details the boarding-houses supply full information.

A horse or some means of conveyance is almost essential in Madeira life, for on foot the beauties of the island are hardly attainable even to the healthy and strong. In the protected area of Funchal the ascent on any side offers a charming and unaccustomed variety of scenery and natural beauty; and the paths which accompany the levadas or mountain water channels run in their level course transversely to the mountain slopes, and may be in many cases followed for miles in their windings, through a country spread with fertility, to their sources in the sombre solitary mountain chasms.

The bay itself is bounded in its eastern extremity by a prominent cape, the Garajão, or Brazen head ; and nearer the city, in a deep ravine, the Lazaretto, wilfully destroyed by fire a few years ago, has now been very recently rebuilt. The road on that side skirts the edge of a line of lofty cliffs, and the rocks abound with cochineal-covered cactus.

Each extremity of the beach is bounded by a fort, and the rapidly shelving shore is washed by the water of a deep sea, without the intervention of a discoloured zone which some of my readers may recollect in the Bay of Naples.

The anchorage of the bay is somewhat deep and insecure, though continually lessened by the deposit brought down through the scour of the winter rains. Sailing vessels approaching from the east in north-easterly weather should not attempt to make the anchorage too soon, or they will be becalmed under the lee of lofty cliffs, and subject moreover to an adverse current ; by keeping out circuitously until south and a little west of Funchal they may avail of a westerly eddy and thus save time. Steamers, however, may safely hug the shore.

In the bay on the western side stands an isolated rock, the Loo or Ilheo, which has been made to serve the purposes of a fort, a lighthouse, a prison,

and a signal station. In the latter capacity the Loo is an object of general interest and utility, making known by a well-understood code of signals the distant approach of vessels announced from signal stations on heights above. Westward of the Loo the Pontinha, connected with the main land, affords a landing place in heavy weather, and partial shelter for the shipping.

In the centre of the beach stands a tall column of solid masonry, erected at the close of the last century for assistance in the landing and unloading of boats. Its purpose, however, was never accomplished, and now it is chiefly interesting as marking the recession of the sea since its construction.

The coast on the western side is less bold and mountainous, and a carriage drive free from excessive gradients has been constructed for a length of several miles in that region. The New Road during the winter season is often a lively resort of fashionable people, and is moreover excellent for walking, driving, and galloping.

Above the city the steep terraced slopes are everywhere richly cultivated. Low down the aspect of vegetation is more decidedly tropical; above, the light green plots of sugar-cane, now once more yielding to vine, are interspersed with the foliage of

various fruit trees intermingled with sunny trellis-covered gardens. Higher again the precious soil is terraced for the cultivation of wheat and other cereals ; wherever there is soil there is cultivation, nothing is too steep, nothing inaccessible, and the almost vertical sides of fearful mountain gorges for ever teem with incessantly maturing crops. Still higher the hills in various places are stocked with oaks, laurels, and chestnuts of great size ; and the fir tree crowns the summits of the lower elevations.

Centrally, in this region, stands out the church of "Our Lady of the Mount." The image of the Virgin at this shrine is thought to be possessed of great endowments and efficacy, and many a time the supplications of the distressed inhabitants have not been made in vain. Upon the steep road from the Mount into Funchal the exciting descent of nearly 2000 feet may be made in a few minutes in a basket-sleigh.

Above this region the hills on the south side become, for the most part, bare, or gorse-covered, and are sometimes snow-capped. In the sheltered ravines the native laurel still covers the ground, but forests of indigenous wood are only to be found far beyond a region accessible from the city as a source of fire-wood.

For separate mention of the various mountain rambles to be made in the neighbourhood of Funchal there is no space in these few pages; they are all well known in the island, and daily life at Funchal is largely spent in the pleasant and endless task of unravelling their numerous intricacies; and moreover many seasons may pass by before the scenery of this mountain-girt city has been exhausted.*

It is my experience that those invalids do best who can give themselves up to an idle contemplative enjoyment of the bounteous display of nature spread before them; not isolating themselves, or refusing all social intercourse, but refraining for a time from the activity of customary occupations, and avoiding more especially the temptation to join in the trying pursuits of the healthy and robust. At first all is new and strange, the spirit is bowed down by the natural dejection of illness and by the thought of disappointed hopes and prospects; but in the dawn of improvement the past is soon forgotten, and pre-

* Beyond the western limits of the district of Funchal the vineyards of Cama de Lobos now entirely cover a soil in former times productive of the bulk of the finest Madeira wine. The same ground has been of late withand much industry replanted; the yield of wine is enormous; and the people are, of all others, the most prosperous in Madeira.

sent circumstances are cheerfully accepted as the necessary and salutary means which tend to eventual restoration and comfort.



FROM THE FOUNTAIN.

CHAPTER IV.

THE METEOROLOGY OF MADEIRA.

THE substance of the present chapter has been derived from various sources; partly from the perusal of much that has already been written, and partly from a comparison of the observations and deductions of former writers; mainly, however, from original observing, systematically conducted, during the winters of 1865-6, 1866-7, 1867-8, 1868-9, and the summers of the last and present years, and also, though less attentively, in the winters of 1861-2 and 1862-3.

The individual features of these seasons may be fairly taken to represent the varieties of climate to which Madeira is possibly subject, and we shall by-and-bye see that my own observations closely accord with results obtained in former times; but the limits of the present volume, and perhaps also the patience of ordinary readers, suggest the suppression of the mass of figures from which my conclusions are drawn.

In the separate consideration of meteorological phenomena *temperature* will occupy us first,* and here I may refer the reader to the map at the end of the present chapter, wherein I have compiled information serving to illustrate the nature and geography of our position. The Madeira group will be seen to occupy in a deep trough of the Atlantic a space between the Isothermals of 64° and 68° ; the warm water of the Gulf stream descends from the north-north-west to bathe the islands on all sides; and Funchal, it will be remembered, has been described as lying on the south side of Madeira, protected from prevailing and possibly cold winds by lofty mountain elevations. Northward of Madeira a line marks the equatorial limit of the fall of snow. In the Atlantic this line passes considerably higher than this region, but as it approaches the coast of Africa it dips rapidly, to include the Mediterranean and part of the southern shores of that sea; leaving Algiers on that side and the well-known retreats from the winters of northern climates on the north side within the region of a possible snowfall. South of the line snow is unknown to fall at the sea-level.

The map also betrays further the general features of the climate we are about to examine, by the depth

* The scale of Fahrenheit is here adopted.

of the sea, by the far distance of any continent of land, by the latitude, and by the direction of the prevailing wind.

The mean annual temperature of Madeira I take to be 67.3° at the sea level in the centre of Funchal,* *i. e.* 17° warmer than that of London, about 7° warmer than Mentone, and about 9° warmer than Nice. I mention the comparison not for any value it may have in assisting our present investigation, but to illustrate the kind of comparative information often furnished. London is chosen to represent a well-known English climate, and Mentone is, perhaps, the best of the Mediterranean stations. Let us examine this mean annual temperature more closely.

Dividing the year into the four seasons we have the following temperatures :

	Madeira.		London.		Mentone.
Winter	61.20°	...	39.12°	...	49.5°
Spring	65.39°	...	48.76°	...	60°
Summer	70.01°	...	62.32°	...	73°
Autumn	67.87°	...	51.35°	...	55.6°

We now, at once, notice, notwithstanding an approximation of mean annual temperature, how

* The *Annual Mean* here given has been derived from numbers of solitary observations compared with the ordinary daily records.

differently the heat is distributed through the year in the above localities.

In Madeira, for instance, there is only a difference of 9° between summer and winter, whereas, in London, there is a corresponding difference of 23° , and at Mentone 24° . Mentone is here seen to possess a climate subject to more extreme changes than that of London.

Now, an invalid coming from a London summer to a Madeira winter will enjoy a mean temperature only 1° cooler, whereas the corresponding change will be felt as 12° cooler at Mentone.

The figures suggest also other comparisons, and we may observe in the foregoing table that the transition from winter to spring at Madeira is little more than 4° , whereas the corresponding progression at Mentone, 10.5° , exceeds that of the climate of London.

It should here be observed, however, that the effect of a change of temperature has no distinct relation to the particular height at which the mercury happened to stand when the fall took place. The sensation of a fall in temperature is merely subjective, bearing reference mainly to the amount and suddenness of the change, and also to the length of time during which an undisturbed temperature had been

previously maintained. In this climate, perhaps, of all others, the force of the last-mentioned circumstance is to be noticed. I have frequently observed that when a depression of only 4° or 5° occurs after many days of constant temperature, the cold is felt, by persons long accustomed to this equable climate, as greatly as a change of much more considerable magnitude in the ever varying climate of England.

Our sensations, however, are not soon rendered amenable to such influences, an appreciation so minute comes only after a winter or two, or even a more prolonged residence; and, even then, one never becomes so conscious of slight changes as are those who constitute the native population. Yet the susceptible frames of delicate persons are soon educated to feel small variations, and until their recovery is sufficiently advanced to enable them to encounter ordinary vicissitudes of climate it is well to use every precaution.

The mean temperature of each month may be taken approximately as follows, and from this statement there is in no published record which has come under my notice, as regards Madeira, a greater variation than 3° .

	Madeira.		London.		Mentone.
January... ..	61·89°	...	37·36°	...	48·2°
February ..	62·70°	...	40·44°	...	48·5°
March	64·0°	...	42·64°	...	52·0°
April	67·10°	...	48·0°	...	57·2°
May	68·40°	...	55·64°	...	63·0°
June	68·20°	...	60·0°	...	70·0°
July	70·10°	...	63·43°	...	75·0°
August	70·93°	...	63·52°	...	75·0°
September ...	70·86°	...	58·80°	...	69·0°
October... ..	68·73°	...	51·78°	...	64·0°
November ...	64·96°	...	43·47°	...	54·0°
December ...	62·58°	...	39·58°	...	49·0°

Now, from what has already been said, and also from the comparison afforded in the above table, it can hardly be conceived, so far as we may gather from meteorology, that anything has been contributed from the south of France to impair the value of the following opinion:—"But the climate which of all others I consider the best suited to consumptive patients generally is that of Madeira. It will be seen by comparisons drawn between the climate of this island and that of the different situations on the continent of Europe, respecting which we have good information, that the winter temperature is considerably higher and more equable, and the summer much more moderate, than at any of these places. For such consumptive patients, therefore, as are likely to derive benefit from climate, I con-

sider that of Madeira altogether the best. And this opinion does not rest merely on a consideration of the physical qualities of the climate, but is warranted by the experience of its effects."—(Sir J. Clark on 'Climate,' page 55.)

Regarding meteorological observing in Madeira, I should perhaps say that the observation of the thermometer is beset with many difficulties, and I doubt whether it is possible to obtain in a given situation, unless the instruments be unduly confined, conditions which are entirely secure from vitiating influences. For instance, an instrument exposed at night, on the north side of a house, to the cool descending land breeze will register a temperature 1° or 2° lower than a thermometer exposed to the south; and, moreover, in the former situation, the dry and wet bulb hygrometer gives an exaggerated dryness. On the other hand, a southern aspect is equally exposed to the influence of the sea breeze during the day, and, moreover, in summer, no aspect is altogether shaded from the almost vertical solar rays.

Yet the many sets of observations which have been taken in this island, and which only differ slightly, appear to show that, for all ordinary inferences, difficulties arising from minor interferences

may be safely neglected. My own plan has always been to observe regularly from one set of instruments placed with all due care, and also to compare these occasionally with other instruments acting in strict unison and placed variously and in all aspects. With the exception of a very sensitive hygrometer divided on the scale to fifths of 1° , my instruments have been supplied by Mr. Casella.

The mean annual maximum temperature of the day in Funchal is 72° ; the mean maximum of the hottest month is 76.05° , and that of the coolest month 67.24° .

The mean annual minimum temperature of the night is 63.04° ; the mean minimum of the hottest month is 68.57° , and of the coolest month 56.12° . The monthly progressions and recessions of these temperatures so closely correspond in quantity with those already stated in the table of mean monthly temperatures, that I refrain from giving them in a separate form. The mean daily and annual ranges of temperature are both as nearly as possible 9° . The mean monthly progression and recession of temperature is nearly 2.6° .

All the foregoing figures regarding the climate of Madeira agree substantially with the records of former times, and there is no evidence of any change

having occurred in the period during which observations have been taken. The temperature as here stated is, however, a little higher than others have given it to be, inasmuch as the climate of Funchal is represented at the sea level, my observations having been as far as possible corrected for altitude. The mean annual temperature has varied according to former observers a little more than 2° on either side of my own estimate, and such variations will be rightly attributed to differences in situation and to the especial characters of particular seasons.

Sir J. Clark adopted the moderate annual mean temperature of 64.56° , but his remarks upon the climate are such as my own figures may easily suggest. Equability is always a striking feature in the meteorology of Madeira, and the annual mean temperature itself represents a pleasant position between summer and winter.

The recession of temperature in the month of June, observed in the table of monthly mean temperatures, is nearly invariable, and depends upon the cloudy nature of days which the Funchalese call "June weather." At that season the mountains are invested by a heavy canopy of clouds intercepting all sunshine after about nine a.m., and dispersing generally after sunset. The basin of Funchal

is thus completely shaded, and the temperature is restrained, whilst a few miles from land the unsifted solar rays pour in their summer strength upon the blue water of the sleeping Atlantic.

It is perhaps necessary, before proceeding further, to remind the reader of the nature and value of mean temperatures. It should be understood that these are merely averages founded upon columns and pages of individual observations. As such they convey much general information, but they give little assistance to invalids, who would interpret from them the liabilities of a climate to which they are about to resort; but rather, they tend, by suppressing extremes and variabilities of temperature, to betray the unwary into disappointing and pernicious circumstances.

Mean temperatures merely give the *amount* of heat observed in given periods without mention of the manner in which it is distributed, and the consequent variations to which a climate may be subject. A moderate mean annual temperature may, for instance, represent a climate like that of Madeira, wherein, night and day, winter and summer closely approximate in the quantity of apportioned heat; and also a climate, such as that of Nice and Mentone, regularly or irregularly subject to heat too

intense in summer to be encountered by invalids, and also to frosty cold in winter.

Nothing is more commonly noticed among invalids who winter abroad, and who venture to consult meteorology at all, than that they seize upon the annual mean temperature as a solitary point of comparison whereupon to ground their judgment, not discerning that therein the excess of summer heat is made to compensate for deficient winter warmth.

Madeira receives a large amount of its annual supply of heat in the winter months, at the very time when it is most frequented by those who leave home to escape the cold of northern climates, and of that season the moderate temperature $46\cdot5^{\circ}$ is the most extreme cold on record.

Furthermore, in summer, relief is here obtained from the intense heat of Western Africa, and the ordinary mid-day temperature seldom exceeds 76° . But, "at Mentone," in the words of a recent writer, "it is decidedly winter from December to April." In that season the thermometer frequently descends to the freezing-point, whilst, in summer, invalids are recommended not to remain. Yet in these two climates the annual quantity of heat is not very different. Upon data almost similar to the foregoing an illustrious author, already quoted, remarks further:

“From this comparative view of the climate of Madeira it must be readily perceived how great the advantages are which this island presents to certain invalids over the best climates on the continent of Europe.”

“It is warmer during the winter, and cooler during the summer; there is less difference between the temperature of the day and night, between one season and another, and between successive days; it is almost exempt from keen cold winds, and enjoys a general steadiness of weather, to which the best of these places are strangers. During the summer the almost constant prevalence of north-easterly winds, especially on the north, and the regular sea and land breezes on the south side of the island, maintain the atmosphere in a temperate state. Close, sultry days are little known in Madeira, and there is neither smoke nor dust to impair the purity of the atmosphere.”

We may now pass on to the consideration of extreme temperatures; and in this section we shall see (and the subject especially concerns many who may read this book) the vicissitudes of temperature which may possibly be encountered.

The extreme minimum temperature 46.5° has already been noticed. In the month of January,

1861, I myself also noticed a nearly similar degree of cold (46.7°). The night, however, in which that temperature was registered was exceedingly stormy and unquiet, and the cold rain which descended was probably beaten in spray against an insufficiently protected thermometer. On the following morning, the first red rays of an almost tropical sun disclosed the tops of the protecting heights around Funchal snow-capped; but 4000 feet below, in mid-winter, under the young green shade of deciduous oaks, invalids who had left their respirators on the shores of the Mediterranean took their customary lounges in the Praças of the city.

I believe, from subsequent observation, that the temperature of the air is never less than 47.5° at any place in Funchal 300 feet above the sea. But at the sea-level I also conclude the extreme possible temperature to be 49° . Temperatures of this kind, if they happen at all during a winter, come in the rare and casual following of a snow-storm upon the mountains, and at these times 50° , 51° , and 52° are often, indeed ordinarily, the lowest registered. After 9 a.m. and before 11 p.m. I have never observed a lower temperature than 52° . So it may be seen that an invalid in Funchal can never be exposed, under the most untoward circumstances, at midnight

when snow is falling on the mountains, to a temperature more than one or two degrees below 50° .

Now, the average minimum temperature for January may be stated to be 56° , and we have just seen that the lowest recorded extreme is only 10° colder. Placing these figures side by side with those of the corresponding season at Mentone, we have—

January.	Madeira.	Mentone.
Mean min. temp.	56°	43°
Extreme min. temp. ...	46.5°	Freezing or colder.

Regarding maximum temperatures, the average limit in January is 67° , and during the winter months the heat, under any circumstances, seldom surpasses 73° . For many consecutive weeks the register thermometer usually does not pass the limit of 65° or 66° , but a transient phase of weather has yet to be noticed in which the temperature is in advance of these ordinary figures. In this place it may suffice to state that the highest winter temperature in my experience, 78° , occurred in the month of March, 1867.

Of the extreme temperatures of summer I am not so competent to speak, inasmuch as those seasons, during my observation, appear to have been exceptionally cool. The mean maximum of the hottest month I have already stated to be 76.05° , and that

average may be taken as the ordinary standing of the thermometer in the hottest part of a summer's day, and the summer maximum is subject to very little oscillation. I should remark, however, that these conclusions relate to Funchal, whereas the mountain districts frequented by invalids enjoy a much cooler summer temperature.

The summer of Madeira is also liable to an exaggerated phase of weather similar to that which we have just noticed as passing the ordinary limit of the winter maximum; and under exceptional circumstances the extreme heat of 90° was once recorded. In my own experience the extreme heat of summer has never reached 84° in the shade, and the weather usually has been characterised by freshness and the constant flow of land and sea breezes.

If we may exclude for a moment the rare sirocco temperatures above given, we may notice, as with minimum temperatures, the small difference between average and extreme maximum temperatures.

Atmospheric pressure.—The mean annual standing of the barometer, from daily observation at 9 a.m., corrected for altitude and temperature I take to be 30.14 inches, and the variations are very slight and infrequent. The most important change occurs when the wind veers from north to south, or back again,

but at these periods a variation of three or four tenths is in general the most that happens. The highest standing of the mercury, 30.58° in my observation, occurred during a strong easterly wind on January 16th, 1866; the lowest, 28.90° , happened on January 3rd, 1868, at a time when a furious gale raged to the south of these islands, and when the famous Dragon tree* of Teneriffe was destroyed. The weather at Madeira was calm, but I ascertained that the mercury stood lower here than in the presence of the storm in the Canary Islands.

The diurnal oscillations of the barometer are well marked, and may be observed with much accuracy during periods of steady weather.

In January, 1868, the first maximum took place soon after 10 a.m., and the pressure declined until 4 p.m. The second maximum occurred at 10 p.m. In July, 1868, the first maximum occurred about 9 a.m., and gradually receded to a minimum at about 4.30 p.m. The second maximum occurred at 10 p.m.; no night observation was taken in either case.

Atmospheric motion will next occupy us, and we shall better understand the nature of the prevailing

* Four hundred years ago this ancient tree is stated by Cordeyro to have possessed the same girth measurement as in our own time.

winds if we first consider how this region is related to the great aërial currents which effect a constant interchange between polar and equatorial regions.

Within the tropics, the solar rays falling vertically and with their fullest effect, the air at the earth's surface is powerfully heated and expanded. It, therefore, ascends through the overlying cooler layers together with a large quantity of watery vapour, and in the higher regions of the atmosphere this warm moist current divides, and flows laterally north and south towards the poles, forming thus the *upper trade winds*.

The space left by the ascending warm current is replenished by a surface stream of air from cooler regions, north and south, and these are the *lower trade winds* : thus we have incessant circulation.

The direction of both these great currents is modified by the difference between the polar and equatorial surface-movement of the earth in its rotation, and to this cause the easterly and westerly inclinations of the trade winds are due. We shall now see how each of them is concerned with the district under consideration.

The lower trade winds refresh the tropics with the cool air of the temperate and polar zones, and the abundant heat of the torrid belt is continually

transported by the *upper trade* currents to regions otherwise remote from solar influence.

Now, the extent of the lower trade wind is found to be continually varying with the declination of the sun in the northern and southern hemispheres. Where the sun is vertical, there the surface trade winds meet and neutralise each other, leaving a space known as the region of equatorial calms, and this space continually follows the apparent annual motion of the sun in the ecliptic.

In the region of calms the moisture which the surface trade wind has gathered in its progress is partially deposited in floods of tropical rain, accompanied by grand and frequent electric discharges. Sometimes, on the calm tropical seas during the warm summer nights, the entire circumference of the horizon flashes almost incessantly with vivid fire, and the short intervening moments of darkness are in a great measure annulled by the millions of luminiferous creatures which are struck into light by the heavy showers of pattering rain.

The polar limit, or commencement of the trade wind, is likewise found to vary as the position of the region of equatorial calms. In the part of the Atlantic which now concerns us the north-east trade wind in summer flows regularly through

the region of Madeira, whilst in winter this region, though even then subject to a north-easterly predominating wind, is not included in its regular influence.

The same variability of position belongs to the upper trade current. Where the sun is vertical we have seen that it ascends into the upper regions of the atmosphere charged with heat and moisture; in its polar progress part of the heat is lost by radiation into space, and the wind descends gradually as it cools. Eventually it touches the surface of the earth, and is felt as a moist warm westerly wind. In summer the point of contact is far north, in winter it is sometimes south, of the Madeiras.

The existence of the upper trade wind may be sometimes demonstrated in the tropics by the contrary motion of a light upper stratum of cloud; and further north it descends low enough to be felt at the summit of the Peak of Teneriffe.

Madeira, then, during the winter, occupies a neutral space between the two cosmical winds just described, irregularly subject to both, though pre-eminently influenced by the north-east current.

During nine months of the year a north-easterly wind is said to blow, and in my own experience during six winters it has predominated largely.

From November, 1867, to November, 1868, there were—

	263	days	of	north-east	wind.
	8	„		north	wind.
	7	„		east	wind.
and	62	„		west	wind.

—
In 340 observations.

I would here ask the entire patience and attention of the reader, inasmuch as the right understanding of many important characters in the climate of Madeira may be assisted by the following details.

It will be seen at once that the westerly winds of winter and the north-easterly winds of summer account to some extent for the approximation of temperatures in these seasons; and we may observe also that the summer temperature is never exaggerated by the possible access of a south-westerly wind. But in noticing separately the characters of the aërial currents in the order of their preponderance, we may observe that the north-east wind of the winter season is not a cold wind, comparatively speaking, inasmuch as it takes its origin immediately north of this latitude in a region whose temperature is modified by the presence of the warm water of the Gulf stream. In the map a large branch of this important aqueous current is seen to descend*

upon these islands, whose direction and force are mainly determined by the prevailing wind of this district.

Now, in the summer months, the trade wind commences in the cooler regions of northern latitudes, and though passing through the warm and moist stratum overlying the Gulf stream it yet reaches Madeira in comparative coolness.

In winter the moisture of the trade wind is condensed upon the mountains, and in Funchal, with its southern aspect and surrounding protections, the finest and driest weather occurs during its continuance, even although the north side of the island may at the same time be enveloped in rain.

Sometimes the temperature of the lower part of the island during the winter is cool enough to permit rain at night to encroach upon the district of Funchal; but so soon as the sun's rays fall upon the ground the rain recedes to the mountains, and a magnificent rainbow, present all day, moves slowly round the mountainous background of the city from west to east. In a winter season there are sometimes twenty days in which rain may thus encroach upon Funchal from the north-east; but ordinarily the north-east wind is a steady breeze, unfelt directly in Funchal, though seen at a distance in the dis-

turbed surface of the sea and in a heavy bank of clouds on the eastern horizon.

When regularly established the weather of northern latitudes may sometimes be deduced from the variation in the force of the north-east wind of this region; it has, in fact, much of the character of the trade wind in the tropics, and its intensity is the measure of westerly wind in the temperate zone. We have now seen that the north-east wind in summer brings down the cool air of northern latitudes, whereas in winter its origin is limited to the warm region immediately north of Madeira, and these circumstances tend to equability of temperature.

As next in frequency we may notice the westerly winds. These may blow at Madeira at any time during the winter, and the first autumnal westerly weather is the boundary between summer and winter.

The westerly wind is essentially warm and humid, and in the autumn it is not unfrequently ushered in with the copious electric discharge which characterises the commencement of the monsoon in other regions. The common direction of the wind is south-west, or west-south-west, and it is liable to shift continually from this point to the north-west

and back again. A wind, also, of the same kind, severe and humid in nature, sometimes blows from the south-east.

Funchal is fully exposed to the south-west variety; the bay gives no protection from it, and vessels in the anchorage put out to sea when it threatens. South of west the wind, however, seldom blows longer than for a day or two; frequently, in fact almost always, after a few hours, it shifts to the north-west, and gradually moderates.

The north-west variety is cooler and more bracing; and, although often a rainy wind, the atmosphere is far removed from the point of saturation, inasmuch as the moisture is intercepted by the mountains.

Westerly winds seldom affect Madeira as mere local weather, but the western coasts of Europe are at the same time, or soon after, visited also with more or less violence. The foregoing are the chief and regular winds; we have yet to consider one or two varieties which fitfully affect us.

Madeira is subject to a few days of northerly weather, produced by a wind which I consider to include in its possible direction a point or two either east or west of north. This is a cold surface wind of great force, extending far north, and under

which ships may sail out uninterruptedly from home ports. At Madeira it blows with great violence; and, notwithstanding the immediate background of hills, it is cool enough to descend powerfully upon Funchal. This weather brings snow upon the mountains, and the lowest temperatures to which the island is subject. I have known the wind to blow continually for fifty hours, but its ordinary duration is much less.

The weather of 1864-5 was largely characterised by northerly weather, but the five remaining seasons upon which these remarks are founded number respectively seven, ten, four, eight, and five such days.

Lastly, an easterly wind, blowing in its integrity from a point south of east, may visit Madeira in the spring, summer, or winter months. In full intensity it is only known in summer, but its characters are now and then felt and well marked during the season either of winter or spring. Its occurrence is variable and inconstant, sometimes being entirely absent, and sometimes inordinately present in the year. The wind is locally called the Leste, but my African readers will recognise in it the "Sirocco," or "Harmattan."

The wind appears to be generated in the sandy

tract of the Great Sahara, and, perhaps, also beyond, in the similar country, lying in the same axis, and extending far into Asia; and the extreme heat and dryness of that region are also the characters of the Leste.

The heated air of those burning plains ascends tumultuously in its expansion through the cooler air, and, carrying with it the sand of the desert and sometimes other matters, pursues a course more or less easterly across the Atlantic. Far above the surface of the water it can imbibe no moisture, and after its descent has become possible by a partial loss of heat, the surface of the Atlantic, 400 miles from the nearest point of Africa, is for a while visited by the mid-day climate of the Great Desert.*

The exact point at which the Sirocco strikes the ocean in these regions is extremely various and uncertain—sometimes it is far west of Madeira; sometimes the warm parching current is felt to blow

* Dr. C. T. Williams, viewing the insufficiency of the received causes of the Mistral in the south of France, has discovered an upper *cold* current originating in Canada, and tilted upwards by the high lands of Labrador. In crossing the Atlantic the descent of the cold current is prevented by the *feeble radiating power of water*. Though it appears to him reasonable, he is aware, however, that the theory would require a considerable amount of evidence to establish its truth! ('Climate of the South of France.')

upon the higher elevations when the lower districts are untouched ; and sometimes it is altogether unfelt at sea eastward of Madeira, when the island is under its full influence. The velocity of the wind is generally great, sometimes excessive ; and its descent upon the Atlantic eastward of Madeira is reported by heavy rollers which disturb the sea in the Bay of Funchal.

The Leste seldom visits Madeira with any great intensity during the winter or spring months ; sometimes it is altogether absent, or often uniting with the ordinary trade wind it is merely noticeable to visitors as fine dry weather ; but occasionally its characters are well marked and disagreeable. The wind commences suddenly as a hot parching wave ; all cloud vanishes during its intensity, and the sun shines hazily in a sky which exchanges its ordinary deep blue colour for a semi-transparent light grey. At night the stars shine faintly, the wind continues, and the temperature is only slightly depressed.

The common duration of a Leste is said to be three days, and some are recorded which have lasted much longer. Those with which I am acquainted have generally become fully established upon the morning of the second day, and have ceased entirely upon the evening of the third day.

Confirmed summer Leste weather is for the most part regarded as a period of personal discomfort and inconvenience. In-doors, one is conscious of dry and parched lips and fauces; the skin has no sense of moisture, the hair upon the slightest touch crackles with electric sparks, and the sudden accession of a high temperature is disagreeable and trying.

The natives moisten the air of their apartments by placing pans of water upon the floors, and exclude the high external temperature by closing doors and windows. Out of doors the wind, refreshing only in sound, blows in strong warm puffs; all nature faints; birds are silent, bees remain languidly about the hive, and plants droop and wither.

The evaporating power of the wind is immense and insatiable.* I have sometimes saturated the ground immediately beneath an exposed hygrometer but with little or no effect upon the dryness which the instrument registers, so great is the greediness and capacity of the wind for moisture.

The dry and wet bulbs of Mason's hygrometer

* The sunsets of commencing or subsiding Leste weather are magnificent beyond all description, and may justify the observation of Humboldt, that the finest sunsets are to be met with in the region of Madeira.

will sometimes diverge 16° or 18° , and once, in an instrument thoroughly protected, I observed the extreme difference of 21° . The temperature at the time was 78° , and the consequent moisture of the air was to the point of saturation as 22 is to 100. Such a dryness is difficult to conceive, and hard to demonstrate by ordinary means; Daniel's Dew-point hygrometer is unable to give any deposit of moisture; and likewise the dew familiarly seen upon the exterior of glasses containing iced beverages is altogether absent.

The atmosphere, then, in Leste weather is, practically speaking, devoid of moisture. Hence it follows that those substances which are suspended or dissolved in the atmosphere by means of aqueous vapour must be absent also.*

Aqueous vapour is, no doubt, a great solvent and carrier of many substances which, though subtle in quality and minute in quantity, are amply revealed to us by the sense of smell; we know that

* Upon this subject some remarkable information has been furnished. Thus, the spread of disease has been observed to be lessened or arrested in extremely dry weather; on the west coast of Africa the malarious poison of intermittent fever is destroyed, and even the contagion of smallpox ceases, in dry sirocco weather. In Madeira, moreover, a devastating epidemic of cholera subsided coincidentally with the accession of a powerful Leste wind.

humid air is necessary for our unassisted cognizance of many of these substances ; but we are not to infer from the absence of noxious smells in very dry weather that the atmosphere is really free from *all* impurity, and that sanitary precaution is then superfluous.

Independently of moisture, Prof. Tyndall has been able to estimate and obviously demonstrate the presence of substances so immaterial as the scent of flowers in the atmosphere by their power to intercept radiant heat, and information of the same kind is abundant.

The atmospheric temperature in Leste weather is always aggravated, and the recorded extremes have already been noticed. A hot summer Leste seldom surpasses the limit of 85° , and the night is a few degrees cooler. The direct rays of the sun, however, in this kind of weather invariably fall short, by several degrees, of their ordinary temperature.

The heat is more severely felt upon the mountains than in Funchal, the Leste wind, being an upper current according to the theory here advanced of its origin, strikes at first upon the mountains in full force ; whereas to reach Funchal it has to curve down over a certain amount of land or sea to the moderation of its essential characters.

The diminished transparency of the atmosphere during the sirocco wind is a remarkable and constant phenomenon. Distant objects are obscured in part by a thin white haze, and the force of solar radiation is diminished. The air, it should be remembered, is cloudless, devoid of aqueous vapour, and abundantly heated. Whence then is this obscurity, and what offers an obstruction to the passage of the solar rays?

In the next section we shall see how powerful aqueous vapour is to intercept and absorb radiant heat, but we have now to inquire how also the almost total absence of that agent coincides with a distinctly diminished penetration. I should inform the reader that this African wind is sometimes a carrier of clouds of dust from the region in which it is generated, and that this dust has, without doubt, been known to fall upon Madeira. Locusts also have been transported and have arrived alive at Madeira after traversing the 360 miles which separate us from the desert. Reliable testimony of this kind exists: I remember, though I cannot pause to look out the exact statement, in Darwin's '*Voyage of a Naturalist*,' that a grasshopper came on board the '*Beagle*' when she was more than this distance from the coast of Africa. The presence of extra-

neous substances would not appear, however, to be a cause of atmospheric intransparency, inasmuch as the haze is constant though the wind is seldom charged with dust.

The aërial haze of a Leste appears to me to be an exaggerated condition of an ordinary fine weather atmosphere, an exaggeration of the light haze which softens the outline of distant lands and mountains, and the opposite of that atmospheric condition which, in the distinctness and apparent nearness of distant objects, is often the precursor of wet weather.

The nature of the phenomenon has been, as yet, as I think, unsolved, although it has, at various times, attracted much attention. The following theory which, perhaps, ought not to encumber this chapter, has occurred to me as affording some explanation.

The presence of a small quantity of aqueous vapour in the atmosphere is now understood to facilitate the passage of radiant heat, and the burning intensity of the solar rays, between showers of rain, is thought to be due to a limited presence of this agent.

Conversely, I regard the diminution of solar intensity during Leste weather as owing to the want of aqueous vapour in quantity sufficient to give

transparency; and this view may be supported independently. The glass globe of a moderator lamp may in part assist in explanation; the globe is *ground* on the outer side, and for the diffused soft light which issues and discusses the shadow of the lamp itself, we are indebted to the minute unevenness of the cut surface. The light which passes through is refracted and confused by a thousand little facets, and the image of the flame is blurred and rendered indistinct. Moreover, the light of the flame cannot all pass through the ground glass; some of it is reflected back from the inner surface, and the glass itself is warm from the entanglement and retention of certain rays within its substance.

But if I dip the glass in water, or in some fluid approaching glass in refracting power, I can fill up, in a measure, the numerous interstices in the uneven surface, and now the rays pass through unimpeded and unrefracted; the image of the flame becomes thus distinct and dazzling, and the diffused soft light is gone.

Now, in the Leste weather, the air being almost absolutely dry, distant objects become indistinct or invisible, and the passage of solar heat is restrained. The heated air I conceive to have its particles widely separated by expansion, and the interstices not being

filled up by aqueous vapour, a certain amount of confusion occurs in the passage of light, and this, when viewed in atmospheric strata of sufficient extent, becomes sensible as impaired transparency or haze. On the other hand, the admixture of transparent aqueous vapour in a certain quantity with atmospheric air is probably necessary to the perfect permeability of the latter; the vapour I consider to be so intimately incorporated with the air as to present one homogeneous mass easily penetrable to light and heat.

We have still to notice those local winds which, independently of the general currents, blow alternately as land and sea breezes. We should remember how these breezes arise: the surface of the land is more readily heated than the surface of the sea, the sea breeze is that cool stream which flows in upon the land when the sun has heated the surface of the latter, and caused the vertical ascent of the lower aërial strata. But, after the sun has gone, the land cools rapidly, and the air in contact with it likewise cools, forming the land breeze which flows at night to underlie the warmer air immediately upon the surface of the sea.

In Madeira these breezes are very constant; the sea breeze is always, except in circumstances rare

and exceptional, present when the sun shines upon the land, and there is a land breeze, with exceptions yet to be noticed, upon every night which has a clear sky. During the prevalence of the north-east wind the sea breeze flows in from the west-south-west, and has often been regarded as an eddy caused by the surrounding mountains. That the sun, however, is the true cause, may be shown by the entire cessation of any such return current at night, or when the vault of Funchal becomes overcast.

In Funchal, and on the slopes above, the sea breeze is felt merely as a gentle current, but upon the western cliffs it blows with considerable force and coolness. The effect of the sea breeze upon the general wind (north-east) is to curve it down to occupy the space left by the inward rush of air, so that during the day the sea is seen to be agitated not far from land; but when the sea breeze has ceased, the descent of the north-east wind over the mountains is more gradual, and the sea is calm for a much greater distance from the shore.

During the prevalence of southerly weather the local breeze takes the exact direction of the wind which may happen to blow, and its presence may be observed in the increased strength of the main current during the continuance of sunshine.

The land breeze occurs with great constancy as a gentle downflow of cool night air. Its strength is a faithful measure of the cooling of the earth's surface, and also of the hygrometric tension of the atmosphere. It is present on all clear nights, except those in which the air, though perfectly free from clouds, is yet so extremely dry or thoroughly saturated with transparent moisture as to render radiation impossible. I have observed the absence of night breeze three or four times on clear favorable nights, but when the air has been almost saturated with moisture.

The humidity of Madeira may be roughly estimated from the character of the various winds already given, and from what has incidentally been mentioned. We now proceed to details.

The annual rainfall I place at 29 inches; I believe that estimate to represent fairly the average amount, and, moreover, it closely coincides with the deductions of others. There are, however, considerable variations—in some years the whole amount has not reached 20 inches, and in others it has exceeded 40 inches; but an amount between 25 inches and 30 inches may be looked for with tolerable certainty.

It is by no means clear that the annual fall of rain has been affected by the denudation of the soil

in the destruction of the forests of Madeira, but the subject will receive some attention in the following chapter. Here I may state that in Funchal there has been no change in 130 years, and that the recorded rainfall is now exactly what it was when the fall of rain was first measured. When the hills were completely wooded, nevertheless, at the time of the colonisation it is quite probable that the moisture of the humid mists which are continually passing over the mountains was intercepted, and that the rivers which now soon after rain dwindle down to tiny streams were then more constantly full.

The rain usually commences in October in heavy showers, and if the wind blow from the south-west the weather is felt, especially by new comers, to be close and oppressive; but the rainy days of a north-west wind are cooler and more agreeable.

The autumn rains are variable in amount and duration; after a few days a period of fine weather is to be expected; but November and December are generally interspersed with rainy days. The influence of the autumn rains is strikingly seen in the immediate stimulation of vegetation; and were it not for evidence given by the vine, the fig, the chestnut, and other species which maintain a definite period of winter repose, the vernal freshness of the

country and the general profusion of spring flowers would suggest rather the approach of summer than of winter.

The winter rains are quite tropical in character—the water falling in dense intermitting showers, and generally unaccompanied by wind. In December, 1867, one of my rain gauges, holding two inches and a half, filled and overflowed in a single night.

The month of January is often without rain, and then is, perhaps, the driest and pleasantest month of the year; sometimes, however, it counts many days of rain.

February, likewise, is uncertain, and has been in my experience the wettest, windiest, and most unsettled month.

March usually brings much fine weather, but rain sometimes falls upon several days. April and May are spring months, with occasional showers. June is almost invariably cloudy. July, August, and September, are cloudless months of unbroken sunshine.

The wet weather of Madeira is seldom lasting, and in the entire winter there are few consecutive rainy days, and very few in which an invalid need be altogether confined to the house. The streets moreover, from their sloping construction and mode

of paving, are immediately passable after heavy rain, and soon quite dry.

Annually there are eighty days in which rain falls; in 1867 the afternoons were fine in sixty-four of these; and there were seven days of incessant rain.

The fall of snow upon the mountains generally happens in January or February; it seldom lies long upon the hills, and the natives hasten to store away in ice-pits a sufficient quantity for the summer supply of the city. Snow is seldom seen upon the mountains lower than 3000 feet above Funchal; and it has probably never been known to lie nearer in altitude than 2500 feet.

The *atmospheric humidity* of Funchal must engage our more close attention, both for the sake of its own interest and importance, and also for the reason that some controversy has been held respecting it. The island is almost always bathed in an atmosphere containing aqueous vapour in a quantity subject ordinarily to little variation; and to the constant presence of this agent the uniformity of Madeira is greatly due.

The equability of any climate is largely dependent upon the presence of aqueous vapour, and hence it is that the climates of islands are always compa-

ratively exempt from the extremes of temperature which characterise the seasons in the central portion of large continents. We have already seen how the mean temperatures of islands and continents may approximate, although their extremes of summer heat and winter cold may widely diverge.

Now, the severe winters of Russia alternate with summers which admit of the cultivation of cereals and many kinds of fruit in great perfection; whereas in Iceland, though the winters are in general less severe than the winters of Lombardy, yet the summers of that island are not sufficiently warm to admit of the ripening of grain. The heat of summer is excluded by the same cause which tempers the cold of winter. As with their seasons, so also is it with the nights and days of insular and continental climates in the amplitude of thermometric range. In many countries extreme nocturnal cold suddenly succeeds to days intensely sunny—as at Mentone, where the greatest cold of night is sometimes at once registered after the departure of the sun. In insular climates, however, the night cooling is gradual and less considerable in amount, the eventual minimum registering a temperature not greatly inferior to the moderate heat of the preceding day.

Let us now, for a moment, inquire how the pre-

sence or absence of aqueous vapour is concerned with these differences. In our sketch of the origin of the trade winds, we noticed how the temperate regions of the earth are constantly warmed by the transfer of solar heat in the vapour-laden air of the equatorial zone; and we also all know how sensibly the climate of Western Europe is modified by the continual flow of the warm water of the gulf stream with its supernatant stratum of humid air. Now, heat is very readily absorbed by water, and, moreover, the large capacity for heat which water possesses is shared also by aqueous vapour. The most potent of the sun's heating rays are largely intercepted in an atmosphere which is to any extent charged with watery vapour, and hence it is that the entire solar force is unfelt in insular climates, where the evaporation from the sea perpetually supplies an effectual screen.

In Madeira the constant layer of vapour overlying the gulf stream guarantees a protection of this kind, and thus it is that our summers are cool, and the sun at mid-day tolerable.* But the vapour of water

* The region of the gulf stream is often spoken of vaguely in books as saturated with moisture. This is truly the case when radiation and transference to colder latitudes have by loss of heat diminished the capacity of the air for moisture; but in this region it is far otherwise.

has also another use. When the atmosphere is dry and the sun is gone, the earth rapidly loses heat by radiation into space; a moist atmosphere, on the contrary, is, to a certain extent, impervious to the passage of the rays of heat, and a moderate temperature is maintained throughout the night. In the climates of continents the shield of aqueous vapour is absent, and hence the extremes of night and day, and of summer and winter.

In speaking of aqueous vapour, let us, once for all, exclude all tangible fogs, mists, and clouds, and restrict ourselves to a transparent invisible substance suspended and dissolved in the atmosphere. A simple, and now almost universal, mode of ascertaining the quantity of water dissolved in the atmosphere is afforded by Mason's Hygrometer. The inventor spent a year in Madeira; and his laborious, but somewhat crude, observations upon the climate have been published. Mason's hygrometer consists of two ordinary thermometers, the bulb of one being constantly covered by a film of water. Evaporation from the wet surface produces a degree of cold, which is marked by the difference between the two thermometers. The degree of cold is the measure of the force of evaporation, and the force of evaporation is the measure of the atmospheric appe-

tite for moisture: the appetite for moisture is the measure of the distance from satiety, and absolute satiety is complete saturation.

Any degree of moisture is now generally expressed as a percentage of the number 100, which is assumed, for convenience, to represent complete saturation. In Funchal this percentage, taking the mean of the whole year, is 76° , "the most agreeable amount of humidity to healthy people being when the relative humidity is between 70° and 80° per cent." (Parkes' 'Practical Hygiene.')

The relative humidity of the winter months is frequently less than 72° , and seldom much greater, except in short periods of westerly weather. The early summer months, June and July, are moister; the relative humidity often approaching the saturation point. No doubt the increased flow and moisture of the gulf stream may contribute to the humidity of the Madeira summer; but it appears to me that we must again look to the origin and extent of the trade wind for a more complete explanation. In the winter months it travels over only a small space of water, and, moreover, the mountains of Madeira are cool enough at that season to condense its moisture largely upon their surfaces; in June and July the origin of the north-east wind is removed

farther north, and in its progress the moisture of a large tract of the gulf stream is encountered. Later in the season the moisture again diminishes, owing, it would seem, to the arrival of concurrent veins of drier air from regions still further north. I am sorry that this simple theory should rest only upon the narrow foundation of my own observations and conclusions.

In Funchal, during the summer, I have no doubt that the general verdure of the lower regions in places inaccessible to irrigation is due to diminished evaporation in the presence of moisture. A warm and very moist atmosphere, though apparently healthy to the general population, is oppressive and uncomfortable to strangers, creating languor and idleness of mind and body, and inducing upon slight provocation copious unevaporating perspiration. During the winter absolute saturation may occur for a few hours during south-westerly rainy weather, and the complete check to terrestrial radiation at such times has been already demonstrated in the section upon land and sea breezes. This kind of weather is familiar to any person who has passed a rainy season in a tropical country.

The extreme dryness to which the climate is subject has already been stated in the section on winds ;

and it need only be remarked here that this extreme belongs properly to the summer season, and is therefore of little consequence to winter visitors. The ordinary humidity during the prevailing wind in the winter months is subject to very little variation from day to day. The humidity, however, advances steadily as the season progresses, and I believe the cause to be fully made out in the manner suggested by the extent of the winds.

The absolute humidity of the atmosphere decreases sensibly as we ascend from the sea level. In the winter of 1865-6 I established a series of stations for observing hygrometers at different altitudes; and, in tabulating the results, my friend, Mr. Monro, who conducted one set of observations, fully demonstrated the steady increase of dryness in proportion to altitude.

The dewfall in Madeira has been differently stated in various treatises, but it appears to me to be subject to ordinary influences. In Funchal, wherever well-known circumstances are favorable, dew may be seen deposited upon substances which chill sufficiently by radiation to condense it. At the sea level I have frequently pointed it out remaining upon grass many hours after sunrise; and I have seen and felt it upon the painted seats of boats upon the

sea. Any one may observe a copious deposit of dew upon any good radiator, the capacity of which for heat is not very great, during north-east weather, when the relative humidity is about 70° , other circumstances being favorable.

The only special point concerning dew in this country worth notice is, that on one or two clear nights, circumstances being apparently favorable, there is no deposit. This happens occasionally when the air is so thoroughly saturated with moisture as to intercept all radiation and consequent chilling. When, therefore, we are told that a damp atmosphere is necessary to the formation of dew, we should remember, as I consider, that dampness in excess may be an actual hindrance. In still Leste weather also there is no deposit of dew and little nocturnal chilling.

The sky at Madeira although not presenting the intense blue tint of the Mediterranean, yet has a much deeper colour than may ordinarily be seen in England. In Leste weather the tint has already been described; the deepest blue occurs between the showers of tropical rain in south-west weather.

In the winter months there are few days entirely cloudless, but the large majority of days answer the following description:—At sunrise the sky is per-

fectly free from cloud, except for a space of a few degrees above the horizon, and the land breeze at that time is gently blowing down the mountain slopes; the sun's rays soon flow into the basin of Funchal, and the breeze slackens and ceases. At about nine o'clock the moisture which the sun is vaporising from the sea and land becomes visible at an elevation of about 2500 feet as detached patches of mist, gradually increasing in size, and coalescing, until a little before mid-day the mountains are closely invested, and sunshine is excluded from the city. From the sea the cloud is seen to be merely a thin belt, above which the mountain tops are clear and sunny; nor are all the solar rays excluded from Funchal. The obscure rays of heat which lie beyond the red colour in the solar spectrum pierce the thin layer of mist, and considerably affect an exposed thermometer; the supply of heat is by no means entirely cut off, but, at the same time, the earth is unable during the continuance of the cloud canopy to radiate any material quality of heat into space. The sea breeze also at this time often slackens and ceases, and a transient feeling of oppression is felt not easy to describe, and, perhaps, harder to explain.

“Cœli tristitiam discutit sol et humani nubila animi serenat.”

Plin. Hist. Nat.

The belt of cloud lasts ordinarily until 2 p.m. or 2.30 p.m., when it gradually breaks up into detached masses which lessen and waste by evaporation, until the receding sun no longer having power to maintain the supply from below, the sky a little before sunset becomes perfectly clear.*

The Madeira sunset we must pass over. Twilight is short, owing to the rapid circumferential movement of the earth, and the comparatively vertical departure of the sun in this latitude.

The nights are almost always unclouded, and the stars shine with considerable brightness; but the sharp and minute definition of an English frosty night is, however, never attained in this climate.

The horizon is never quite free from clouds, and I have never been able to observe a star within several degrees above the horizon. The zenith, however, is always clear, and admirable for general astronomical purposes, and the winter exile may measure the

* The author of 'Winter in the South of Europe,' at p. 78, has with some boldness catered an electric theory to meet a difficulty of this kind; and a very small practical knowledge of electric science will enable his readers to decide upon its merits. In the kind of weather I have described, *insulation* is unaltered, but it is possible that *induction* may afford some satisfactory explanation. It appears to me, however, that electric theories are now often made a convenient refuge, such as the *subtilitas demonis* afforded in times gone by.

distance from home by the recession of northern stars, or by the unwonted lights which his southern journey has brought into view.

Such is the sky of ordinary Madeira weather in the winter when a gentle current of wind flows from the north-east. When, however, the same wind prevails more decidedly, a large bank of clouds hangs upon the eastern extremity of the island, and, accompanied by rain in that part, extends far away to the south as a dense black barrier. Funchal is completely sheltered from the wind, and the sky is clear night and day; the midday cloud stratum, however, still partially hangs over the amphitheatre.

In south-westerly weather the whole vault is irregularly covered by layers of clouds at various altitudes, and the town is deluged by the tropical rain of heavy black masses which flow in successively from the south. The sky of easterly weather has been described.

During the occasional cold northerly wind of winter there hangs a persistent bank of clouds along the tops of almost the entire range of hills at the back of Funchal. The bank is merely the visible expression of moisture by the cold mountain-tops; and though apparently stationary, is in reality strongly agitated,

and urged across the basin of Funchal. In its passage across the heated valley the moisture is completely vaporized; but at sea beyond, it again condenses and reappears as a dense cloud.

Fog and mists upon the surface of the sea or land there are none. I have sometimes observed a mist rolling in from seaward to hang, for a few hours only, 700 or 800 feet above the sea, but the limit of 1000 feet ordinarily is unpassed by cloud.

Ozone.—The amount of ozone, as denoted by the reaction given by Moffat's papers, may be, upon a general average, expressed by the No. 3 in a scale of units of which 1 and 9 are respectively the lowest and highest extremes.

In the wet weather of south-west winds already noticed, ozone attains often to the quantity represented by the No. 7 in the scale, but in Leste weather the papers are hardly, if at all, affected.

Solar radiation.—The intensity of the sun's direct rays, as measured by a blackened bulb thermometer *in vacuo* fluctuates from 120° to 135° ; and during the early winter months the maximum is generally attained about 10 a.m.

The variations appear to coincide distinctly with the amount of atmospheric humidity, the thermometer rising to 148° in northerly weather,

and seldom attaining 125° in humid south-west weather.

The painful and dangerous difference between sunshine and shade in many climates is also due to the absence of aqueous vapour. There is no cold shade in an atmosphere reasonably humid, inasmuch as the contained aqueous vapour intercepts and diffuses the excess of direct solar heat, and renders the shade safe and temperate; but in the former case the air is too dry to intercept any great quantity of solar heat, and the direct rays of the sun are oppressively hot whilst the shade is dangerously cold. Such climates are often recommended, and there can be none more treacherous for delicate persons.

Surely we need not seek these evils. Milton thought extreme alternations of temperature might refine the tortures of a place of which he wrote :

“Thither by harpy-footed furies hal’d,
At certain revolutions all the damn’d
Are brought, and feel by turns the bitter change
Of fierce extremes, extremes by change more fierce,
From beds of raging fire to starve in ice;
There soft ethereal warmth, and there to pine
Immoveable, infix’d, and frozen round,
Periods of time, thence hurried back to fire.”

Terrestrial radiation is influenced by similar cir-

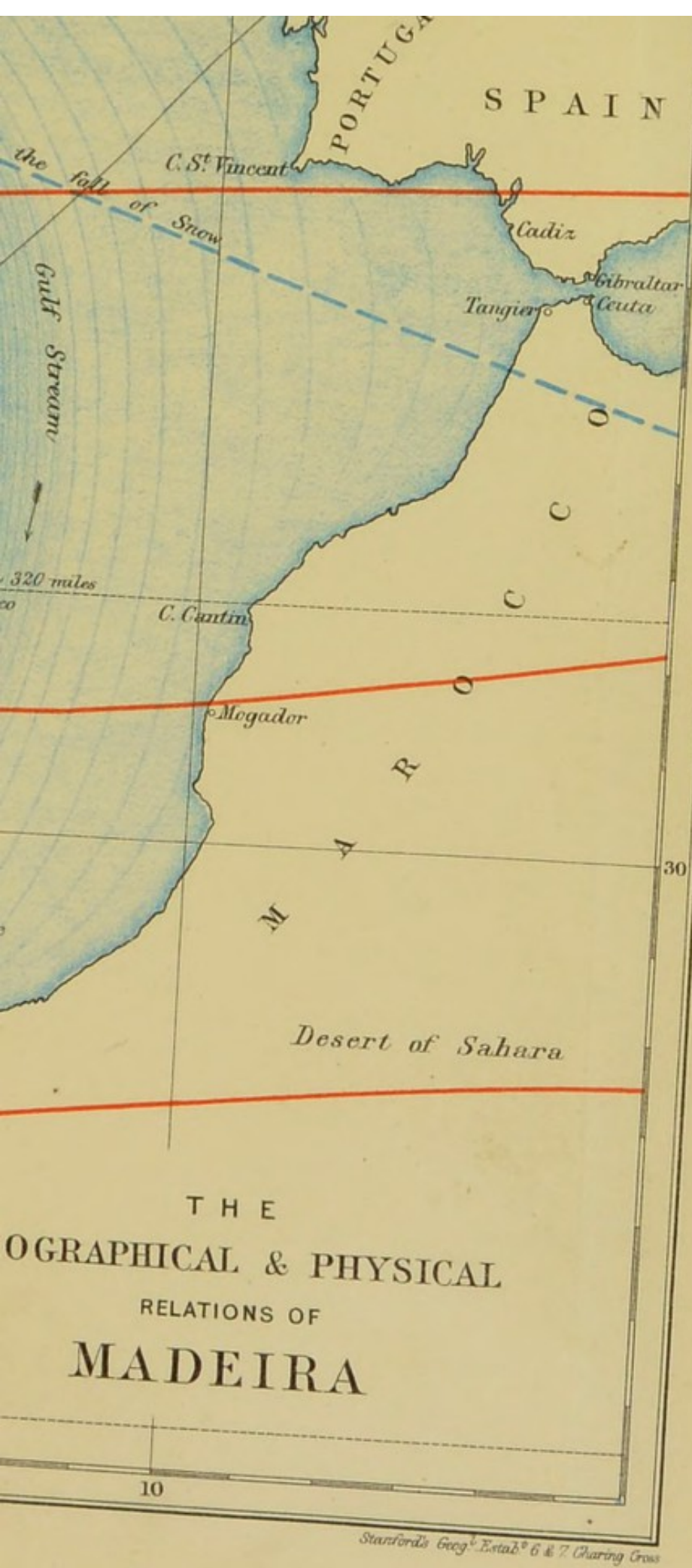
cumstances. In the consideration of land and sea breezes we have already seen how in very damp though perfectly clear nights there is no radiation.

The ordinary depression of a thermometer properly protected and exposed is at night about 6° below the temperature of the shaded thermometer. The extreme depression is slowly reached and there is a moderate deposit of dew.

In dry cool northerly weather the depression is greater and more rapid, and the minimum—sometimes 12° below the shade temperature—is reached about midnight; the deposit of dew then is copious and early.

The geological formation of the island, it should be borne in mind, is entirely of basalt, a substance which is largely employed in building and paving. The capacity for heat which this stone possesses is very large, and therefore, though a powerful radiator, it cools slowly. Even at sunrise we may stand upon the edge of a basaltic cliff and feel the heated current as it ascends, and we may see the wavy motion of the air as it rises. Doubtless the slow cooling of the basaltic rocks contributes to the moderate nocturnal register of the thermometer and to the maintenance of a mild temperature in winter.

We have now glanced at the chief individual features of the climate under consideration, and the length of the present chapter has been unduly extended. It remains, for the sake of those who would escape details, to give very briefly a general view, and incidentally to deal with matter hitherto deemed inadmissible.





CHAPTER V.

THE CLIMATE OF MADEIRA.

THE general appearance of Madeira at all times ; its constant verdure and freshness ; the unceasing maturation of fruits and flowers, and the sense of a constantly moderate temperature, must interpret to the most casual observer much of that which has occupied our attention in the last chapter.

We have seen the climate to be marked by uniformity in every feature ; not free, indeed, from all changes and vicissitudes, but entirely secure from the oscillations felt in the most protected parts of the British Isles and continental Europe ; not without the periodical accession and recession of temperature which mark the seasons of summer and winter—but exhibiting these changes in progression so gradual, and in degree so inconsiderable, as to offer really no summer to the inhabitant of the tropics, and really no winter to the inhabitant of temperate regions.

Having a mean annual temperature of 67.3° , the

average heat of summer is hardly more than 70° , whilst the mean temperature of the winter season is always above 60° ; and the sultry heat of summer and the frosty cold of winter are excluded by variations which, in recent times of remarkable changes elsewhere, have never transgressed the narrow limits already given.

The extreme heat of summer is seldom more than 77° in the hottest part of the day, whilst in winter the lowest possible temperature is hardly under 50° in the coldest part of the night. "In a few words," I may say with Sir J. Clark, that "there is no occasion for a person, throughout the winter in Funchal, to breathe night or day within doors an atmosphere below the temperature of 64° ; and that, by choosing his hours, he may take abundant exercise during the summer without exposing himself to oppressive heats."

The range of temperature during the day and night is likewise marked by the same moderation. Varying from 5° to 15° , and averaging 9° , the mornings and evenings are almost always cool and refreshing, and the decline of temperature is constantly gradual and continuous, without any sudden depression at sunset.

The causes of so even a distribution of heat we

have seen to have reference largely to the origin of the prevailing wind in the different seasons of the year.

In the winter season we have our greatest atmospheric dryness, and the solar rays are not then excluded by any dense shield of watery vapour. As the spring advances the moisture of Madeira is increased, and the solar rays are greatly intercepted; but, eventually, in the summer, the north-east wind arises in latitudes far north, and reaches this region in moderate dryness.

A singular example of the power of aqueous vapour to intercept solar heat may be practically observed, I conceive, in the relative states of vegetation at different altitudes upon mountain slopes. Many of us have often observed in this island, and, perhaps, with some surprise, how much earlier in the season of spring deciduous trees regain their foliage a few hundred feet above the sea than their fellows lower down. Perhaps diminished atmospheric pressure may have some influence; but the main cause of the difference may be attributed to the greater intensity of the direct rays of the sun in the higher regions, due, doubtless, to the diminution of a screen of aqueous vapour which is more dense and powerful to intercept lower down.

The fine weather of Madeira is characterised by clear and sunny mornings and evenings, noontide being overcast.

There are few days entirely cloudless, and very few entirely cloudy; in the course of the whole winter season perhaps eight days may occur to confine an invalid entirely within doors.

The wet weather, that which mainly constitutes the rainfall, occurs in heavy intermitting showers of vertical rain, enduring only for a day or two, and rarely continuing throughout an entire day. Lighter rain also falls often in northerly weather, and contributes to the number of so-called rainy days; but sunshine is not thus often intercepted, the sky over Funchal remains clear and bright, whilst the northern and eastern parts of the island are decidedly rainy.

The humidity of the air in this climate, *i. e.*, the amount of water invisibly incorporated with the atmosphere, exists with remarkable equability in a quantity found by general observation to be agreeable and beneficial. During the warm wet weather of a south-westerly wind, however, the atmosphere is nearly saturated with moisture and a feeling of general depression is felt. This may last a few hours, and its worst consequence to an invalid is a

transient diarrhœa. We have already considered in detail an extremely dry atmospheric condition, restricted in its integrity to the summer season, and fleeting in duration. Weather also considerably dryer than the given average is encountered occasionally in the stronger breezes of the north-east wind. The sunshine is then intense, and the sky bright and clear, but the air is keen and searching, approaching in quality that of less equable climates, and this is our most dangerous weather.

The winds of Madeira are by no means insignificant. From the north they sometimes sweep down over the mountain background with great force, more particularly in January and February, and are cold enough to make precaution necessary. The south wind is warm and rainy, and although not much felt in Funchal, seldom fails to manifest itself once or twice in the winter in severe, though quickly subsiding sea disturbance.

I should remark that in Madeira the dampest atmospheres occur during the warmest weather; we know nothing of the cold damp of northern climates, nor has any fog or surface mist a place in this climate. The atmosphere of Funchal, moreover, is clear and free from dust at all times, even during the agitation of the strongest winds, neither

is there any smoke, save that which issues from the solitary wood-fire used in every house for cooking purposes.

The geology of Madeira has already received the brief consideration possible in these few pages.

The vegetation must be permitted to occupy us only so far as its great facts may be considered to interpret or influence the climate.

At the time of the colonisation, Madeira was no doubt clothed entirely with the undisturbed woods of indigenous species; and at the present time we may occasionally find upon the summits of mountains, long denuded, the still fragrant fragments of cedars which once contributed to the forests of the loftiest elevations. The native forests are composed chiefly of several species of the natural order Lauraceæ, of which, the til, the barbusana, and the vinhatico, are the more magnificent examples. Certain arboreous forms of the Ericaceæ abound; and the Myrtaceæ and other classes are also well represented. Formerly the laurels were interspersed with the native cedar, *Juniperus oxycedrus*,* and the quaint looking dragon tree,† but both these

* The wood of this tree yields by distillation the *Oil of Cade*, well known as a valuable remedy in medicine.

† Yielding the old *Sanguis draconis*.

have now become rare, and are chiefly to be met with in private plantations and gardens. The recklessness of forest destruction, already referred to as chiefly noticeable in the heedless neglect of replanting, is seen also in the insufficient protection afforded to the young wood, as it springs up spontaneously, against the roaming of cattle and wanton mischief.

It is worthy of note that wherever the ground has been allowed to reproduce, the original species have not given way to other forms, in accordance with observations made elsewhere, but that the laurel has invariably grown again. Mr. Darwin also has remarked that the vegetation now occupying the sites of ancient Indian temples in America is composed of the former species of indigenous wood, so that any new forms which may have arisen when those places were deserted must have been transient in duration.

In Madeira very many valuable trees, introduced from time to time, have suffered from disease or some destructive blight, whilst I am not aware that any native tree has been so affected. Yet the Spanish chestnut tree, presenting in some places a size which must have occupied many centuries in its growth, and must necessarily, therefore, have been domiciled in Madeira anterior to the date of Zarco's

colonization, has been severely blighted and destroyed. Let us hope better things of the Cinchona. By the kindness of Dr. Hooker I have succeeded in introducing one variety of this valuable plant, and we are now endeavouring by experiment to ascertain the most favorable locality with regard to aspect, soil, and altitude. I can now merely record that the plants thrive and promise well. The Cinchona seed has never germinated in Madeira; and my own efforts, though carefully made, have repeatedly failed, both in respect of seed furnished by Dr. Hooker from Kew, and Mr. Broughton from the Neilgherries in India. The Cinchona, however, is easily propagated from cuttings.

The north side of Madeira is still well clothed; and although there are, perhaps, few trees which can aspire to the dimensions handed down to us in the relics of former days, the dark and ancient foliage still covers both hill and valley. The hill tops on the south side, however, have never recovered their verdure since the first denudation of the soil. The reason of this difference is mainly twofold. Firstly, the proximity of the city and its fuel requirements have led to the more complete destruction of trees upon the south side; and, secondly, the moisture of the prevailing wind is for the most part appropri-

ated by the northern slopes to the vegetation of that aspect. The south side, moreover, is exposed more particularly to the violent and scouring rain-fall of the south-west wind, which in a short time suffices to wash the precipitous hill sides of all soil and humus, and to render further growth of vegetation difficult, except by terracing and other artificial means.

We are now concerned to inquire what effect has the denudation of the hill tops had upon the climate of Funchal? Our data for answering the question are unfortunately very limited, forasmuch as the greater portion was cleared long before any meteorological observations were recorded, and as no mention of the subject appears in any of the olden writings. But the influence of trees upon the humidity of a climate is a subject deserving of especial notice at the present time, when facts illustrating it are eagerly sought in all countries, when the hasty destruction of forests has in some regions led to much anxiety as to possible consequences of evil, and when we are asked to believe that the planting of trees in some places has produced rain in tracts previously rainless.

We may consider the tangible influence of forests in this matter, firstly, with regard to the power of

directly augmenting the moisture of a climate ; and secondly, as to the property of absorbing and husbanding rain-water. In this island the great power which trees possess of contributing to the moisture of a country may be well observed upon the mountains. The gentle breezes of the north-east wind almost constantly flow upon the land charged with a certain amount of moisture. During the night the quantity is not large enough to condense into vapour, and the sky therefore remains clear ; but in the morning, after several hours of sunshine, the moisture is so augmented, chiefly by evaporation from the sea, as to become visible as mist or cloud at a certain elevation.

Two chief causes tend to determine the altitude at which the moisture shall become visible. Firstly, the facility with which heat is radiated into space from the upper regions of the atmosphere by so powerful a radiator as water or aqueous vapour ; and secondly, the increased force of evaporation in high altitudes. Often in Madeira on a fine day, when the sun is pouring obliquely into a deep valley, we may stand upon the brink of the precipices above and watch with interest the action of these two causes.

The heated air ascends charged with moisture,

and at a certain elevation, which varies in different kinds of weather from 2500 to 3000 feet, a light stratum of mist appears and remains stationary. The invisible aqueous vapour is converted into mist in its ascent at a point where it is enabled, in the absence of dense overlying strata, to cool by the rapid radiation of its heat. But at this point, also, the atmosphere has become rarefied; and the same circumstances which admit of the condensation of vapour by the discharge of heat, tend also to increase the force of the process by which the mist is again rendered invisible and evaporated. Hence we may observe that the light stratum does not increase in thickness during the constant supply furnished by the heated ground below, inasmuch as a similar amount is continually evaporated from the upper surface. In the evening the sun departs from the valley, and the thin stratum, no longer being supplied from below, entirely dissipates, and the night is cloudless.

The moisture of the ordinary breezes in Madeira, augmented as we have seen (I speak from habitual observation), becomes apparent, as a rule, a little way at sea before it is actually driven upon the mountains; and the mist invests the hills whether there be trees or not.

In approaching the land, the fleecy masses coalesce and augment in size; and, at length for a while, rest at an interval of eight or ten feet from the hill sides. The interval slowly diminishes; and eventually the mist comes in contact with the soil or leaves of trees.

I am by no means satisfied that the interval depends entirely upon a temperature at first sufficient to vaporize the mist at arm's length, and at length exhausted; there may be also some electric repulsion slowly lost by deficient insulation.

Thus far, in the generation and attraction of mists, trees appear to exert no especial influence; but their power upon mist already formed is very great. Where there are no trees the cloud is driven along, depositing little or no moisture, at length to be again completely vaporized over any heated ground and carried away to sea; but trees largely intercept mist; and the small component vesicles of water coalesce upon the leaves and branches, and fall in drops of water upon the earth. This I regard as the principal mode in which trees contribute to the water supply of a country.

The mists will form whether there be trees or not; but the water, otherwise lost, is strained out and saved by the forest foliage. I believe the process to

be purely mechanical,—the mere aggregation of small particles into drops—and, moreover, I have never been able to observe that mist is especially attracted by any particular kind of foliage.

The mist is at first apparently dry, but it slowly increases in moisture and density until, if in motion, it forms drops of water upon the leaves. When the mist is stationary, little or no deposit occurs. I have watched with much interest for the commencement of dripping in reference to the supposed pre-eminence of certain kinds of foliage in power of condensation.

The pine trees invariably begin first, their rough, brush-like clusters of leaves being well adapted to intercept the smallest particles of moisture; the yield of water from this source is very great. The laurels extract water plentifully from mists which are more sensibly damp, and their action in this respect is more important than that of the *Coniferæ*, inasmuch as the dense shade of their broad leaves is, subsequently, a greater hindrance to the evaporating power of the sun upon the collected water, and as the undergrowth is considerable and highly retentive of moisture.

The important influence which trees of the laurel tribe exert upon the maintenance of springs of water

is well understood in this country, though the admirable laws which have been devised for their preservation are too much disregarded and contravened. In one of the Canary Islands the people still show the place where, at the head of a deep valley, stood a fine, solitary til tree which daily used to strain a large quantity of water from the humid mist conveyed inland by the sea breeze. The tree is mentioned by Cordeyro and subsequent writers with the customary embellishments of exaggeration and superstition; but both the spring of water and the tree are now gone, and the mists, though they still remain, pass over unstrained of their moisture.

The aggregation of small particles of water from humid mists, then, we may regard as a great source of water in a country like Madeira, where the moisture of the prevailing wind is daily condensed upon the mountains; and such a manner of supply must be common to many countries although it is often unrecognised.

The dewfall is another direct source of moisture afforded by trees, but in amount trifling compared with that just noticed.

Lastly, as to the augmentation of the fall of rain. Such a power has been largely attributed to the presence of wood, vaguely by some who confound

such an attribute with the influences already spoken of and which are yet to be discussed; and boldly by others who assert that rain now falls where woods have been planted, in tracts formerly rainless. From Madeira we have little recorded information to give upon the subject, inasmuch as there has been no great denuding of the country in recent times, and since the recession of native woods has been in late years compensated by the advance of introduced species. We know, however, that the rainfall during 130 years has undergone no change, and we know also that the rains fall under circumstances precisely similar to those which must have existed when the forests were intact. The moisture of the great aërial currents is quite independent of local causes; the winds arrive charged with moisture collected in other regions, and from the indifference with which they discharge their rain over the wooded and unwooded districts of Madeira I am inclined to believe, assuming the nature and direction of the great currents, aërial and aqueous, to have remained unaltered, that the rainfall is not less now than it ever was. It is worth mention that the eastern end of the island, *i. e.* that which is most exposed to the north-east wind, receives the most constant rain notwithstanding the complete absence of wood, and

also that a large uncovered table-land in the western part is perhaps more often covered with mist than any other portion.

The facts which are commonly stated regarding trees and rainfall are as yet unsatisfactory, and at least incomplete, neither is there sufficient practical evidence to show in respect of what laws of physical science the connection exists.

Even with regard to the plantations of Egypt, travellers have something to tell us about the memory of aged inhabitants and traditions of previous rain, and there are perhaps few who maintain that the nature of the dry north-east wind is to be changed by the planting of forests. We know with certainty, however, that in some districts the fall of rain has not sensibly altered after a wide destruction of wood.

The influence of trees upon rivers and upon general humidity is a matter of the first importance as regards the restraint of torrents and the husbanding of rain. The mosses and general undergrowth of large laurel forests have a great absorbing power; the water of heavy rains is retained and allowed to percolate the superficial soil amongst the roots, to be given up slowly and continuously throughout the year.

The restraint of evaporation by the dense shield afforded by forest shade is also another element of conservation, and these causes act more powerfully in maintaining a regular supply of water than those which we have already considered as directly augmenting the absolute quantity derived from mists and dew. An important confirmation of this view of the influences of trees has been afforded in the Island of Ascension, where the solitary spring of water was lost by the destruction of trees, but was eventually restored by replanting. In this case the fall of rain was not influenced, but the trees saved and shielded the water which fell. Likewise, also, in the lakes of Geneva, Neufchâtel, Bienne, Moral, &c., a diminution of water is stated to have coincided with the progress of cultivation and the clearing of the surrounding country. The sun now pours down upon the unprotected soil, and largely evaporates the superficial water. Yet the rainfall in these cases has not altered.

The extent to which trees restrain evaporation may be sometimes measured in an uncovered district by the sensible diminution of a mountain stream after a day of intense sunshine. On the eastern side of the basin of Funchal the upper lands have been almost entirely cleared of trees ; the rain water

descends impetuously in a torrent, leaving a tiny stream which flows steadily so long as the sky remains overcast, but ceases altogether after one day of sunshine. I do not think that the rains are now heavier or more fitful than in former times, but there are now no woods on the south side to restrain the drops which unite to denude the rocks of their soil and to form the mighty torrents witnessed in every winter season. I do not doubt that the planting of trees in the valleys at the head of the main ravine in the eastern district would lead rapidly to a nearly constant supply of water in a region where it would be useful; and this opinion is strengthened by the fact that the direction of the daily sea breeze and its accompanying moisture tends almost always towards that district. Nevertheless, the replanting of trees on any large scale above Funchal, would tend to increase the general humidity of the climate, and that is undesirable.

There is at present no real want of water at any season; the island from its position can never lack moisture; and the removal of wood has without doubt contributed beneficially to the character of the climate of Funchal.

The latitude of Madeira is well denoted in the aspect of vegetation at or near the sea level. Specie

absolutely tropical are abundantly represented, of which some attain to luxuriant perfection, but the cocoa-nut palm will only just grow; and the fruit of the date palm does not ripen, notwithstanding that the tree reaches its full dimensions and grows easily.

The custard apple, and some others originally transported from southern latitudes, are able to disregard the inversion of the seasons, and to bear their fruit in the winter and to shed their leaves in summer.

The berry of the coffee tree ripens perfectly, and yields a beverage locally thought superior to that of imported kinds.

The banana perhaps of all acclimatised species is most eminently suited to the climate; equalling, in quality of fruit, and general size, the utmost development of the plant in other places.

In the same region the plants of the temperate zone are also flourishing and abundant; but variously affected.

Some, as the Spanish chestnut, rigidly maintain previous habits, sleeping their long period of winter repose notwithstanding a temperature sufficient in their natural climate to stimulate the most active germination. The wood of the chestnut in Madeira is hard and excellent.

Others, again, follow more closely the nature of the seasons. Thus, the British oak becomes a deciduous evergreen, putting forth leaves in January, whilst the former foliage is yet unshed. The wood of the oak is soft and useless. Moreover, some of the important fruit trees following the general appearance of things, betake themselves after the autumn rains to flowering and the bearing of fruit.

Some of our temperate plants, however, definitely resist the climate, neither is it possible to imitate their natural climate by selecting an altitude the temperature of which compensates for latitude.

The general cultivation of the soil in Madeira is, for the most part, a simple waiting upon Providence, and the island is a very museum of obsolete processes, and antique agricultural implements.

There is no efficient refreshing of the soil, no attempt to obtain superior qualities, and crop succeeds crop without any interval and with no thought of variation or rotation.

The cultivation of wheat and other cereals has of late been greatly extended; and satisfactory crops are now yielded by mountain lands hitherto held to be unserviceable from their climate and exposure. Formerly the produce of wheat sufficed only for three months' consumption, the remainder having to be

imported ; whereas now three months' consumption has to be imported ; and the remainder is grown in the island.

The successful cultivation of fruit trees is beset with many difficulties, and the apathy and ignorance of the people are here sufficiently evident. The trees have it all their own way, are allowed to grow to any extreme size, and are never pruned.

The yield of fruit is enormous in quantity, but turnip-like, hard, and flavourless in quality. But I imagine that the stone-fruit trees for the most part too sensitively yield to the stimulating influence of the climate in all seasons to allow of the hope that their fruit may be brought to English perfection. The season of winter repose is broken into, or even entirely abrogated ; the trees flower in autumn, and some of them become altogether ever-green, constantly producing large quantities of wood.

For much enlightenment and improvement in all these matters we are constantly indebted to the practical knowledge and experience of many of our winter visitors ; and there is perhaps no country where, from the constant activity of vegetation, gardening becomes a more interesting and pleasant occupation than in Madeira.

We may notice in passing two elements in the cultivation of the soil which demand all admiration. Firstly, the laborious manner in which every available plot of ground upon the steep mountain declivities has been levelled by stone terracing; and secondly, the excellent system of irrigation provided in the construction of *levadas* or watercourses. The latter are the most considerable of the national works of Madeira. Small in dimensions, seldom more than eighteen inches wide, they convey, at a gentle slope, the pure abundant water of the central ravines to be distributed to a thousand tenements.

In their course they defy all obstacle; and some of the finest scenery of Madeira is to be enjoyed from the slender parapet of the tiny stream as it passes, scarring at mid elevation the vertical faces of the loftiest precipices in its meandering mountain course.

The staple products of Madeira are still faithfully depicted in the sugar-cane and vine branches adorning the Madeira shield upon the cover of this book. In early times the sugar-cane seems to have been predominant; but the plant was eventually introduced into the more congenial soil and climate of the West Indies, where its mature and abundant

yield, and perhaps also other circumstances tended to discourage its further growth in Madeira. But when, in 1852, the vineyards were destroyed by blight, and another cultivation became necessary, the people with one consent, and with great success, returned to the sugar-cane.

Eight years ago every valley and the slopes far up the mountains were covered with the light green foliage, and large quantities of manufactured sugar have been since exported. At the present time, however, the vine is again largely supplanting the sugar-cane, and the former may be said to occupy again already many of the situations found in former years to be best suited to its growth. The cane, on the other hand, is retreating from the arid soils of mountain slopes into well-watered valleys, occupying, apparently, a greatly diminished area. The vine, furthermore, still encroaches, and a tendency to its general propagation is manifest in all directions.

A variety of circumstances, many of them external, may affect the possible supremacy of either vine or sugar-cane.

As to the vine, the people have learned to meet the destructive influence of the vine fungus still present in all its first vigour, and there exists also

a general desire to re-establish the credit of Madeira wine by every legitimate means; the new vineyards having been entirely planted with verdelho, to the exclusion of inferior varieties. *

The cultivation of the vine is also very easy. A vineyard once established will yield for many years without replanting; little or no water is necessary, and the crop does not quickly impoverish the soil. Lastly, it may be stated that the quality of the old wines, and the promise given in recent vintages, show sufficiently how eminently fitted is this country for wine growing.

A word or two as to the vine blight. This evil made its first general appearance in 1852, when, in the absence of any known remedy, the vineyards were totally destroyed. Ordinarily known as the *Oidium Tuckeri*, its nature is that of a minute powdery fungus, which attacks at once leaf and grape, to the destruction of both. The fungus spreads its mycelium as a white cottony web, obstructing growth and respiration, and reproducing itself on an enormous scale both by spores and the detached terminal cells of branches. The disease shows itself first at the end of May or in the next month attacking simultaneously and in all directions indifferently, its most rapid development being

marked by what in England we should call overcast close weather.

The grape is generally well advanced before it is affected, and the danger is over when the fruit becomes translucent in the process of ripening. The universal remedy, or rather preventive, is sulphur; a well-ordered vineyard is kept constantly dusted both on leaf and fruit with the flowers of sulphur, and the mischief is effectually restrained.

But on a very little negligence, as, for instance, if the sulphur is not immediately renewed after rain, the blight is at once manifested.

The evil, moreover, after the lapse of seventeen years, is altogether unabated, and every bunch of grapes not liberally treated with sulphur is certain of destruction.

The origin of the blight, its sudden development in spring, its preservation during the long winter months, when the vine, the only plant upon which it is manifest, affords it no apparent shelter, are problems upon which no light has yet been thrown. At the present time much mischief may be done by those who allow their vines to grow and yet neglect the blight.

The spread of the fungus is exceedingly rapid and subtle, and every means should be vigorously used

which may tend to prevent or modify the continuance of a great national calamity.

The presence of sulphur in the modern wines of Madeira is still causing considerable inconvenience, not so much on account of a disagreeable taint of sulphur in its well-known odorous union with hydrogen—a nuisance easily removable by the reaction of sulphurous acid—as on account of the check given to fermentation by the presence of the latter agent. The present wines ferment irregularly and insufficiently, and although possessed of an excellent flavour, their quality remains unduly saccharine.

It yet remains to be seen whether the vine is permanently re-established in Madeira. People abroad have learned to do without the wine—a forgotten taste has to be revived; and whilst, in the case of Madeira, former duties and restrictions yet prevail, international treaties have given every facility to the introduction of the light and cheap wines of France and Germany. A large quantity of wine, perhaps more than 4000 pipes, is annually made in Madeira, the disposal of which is not easy to imagine; and any serious decline in the present prices will greatly discourage the extent and maintenance of the vine culture.

The sugar-cane, on the other hand, has, perhaps, more to fear from internal than external difficulties. At present the produce is amply marketable in Portugal, where, free of duty, it is admitted to an advantageous competition with West Indian sugars, and there is no probability that Portugal will at present remit the taxes upon foreign imports. If that were possible the Madeira plantations would at once succumb. But, setting aside all consideration of the quality of Madeira cane, and the degree of ripening and maturity in this climate, both of which are considerable and respectable, we may inquire with doubt whether the plant is suited to a continued domicile in this country, and whether it will long endure the kind of cultivation here given. We know that the plant was once abandoned after attaining a fair excellence, and it may probably have been affected as is stated of the cane of the Mauritius.*

At the present time the plant is cultivated upon the comparatively shallow soil of terraced slopes in well-watered localities; the people are seldom content to leave it the sole occupant of the ground, but, so long as it is possible, all kinds of vegetables are intermingled. Eventually, the bulky crop is

* Darwin, 'Animals and Plants under Domestication.'

removed, and immediately again the ground, neglected, or at the best inadequately manured, is similarly taxed. The cultivation of the sugar-cane may then at any time cease in consequence of the incapacity of an unregenerated soil to continue its support; and, further, it will gradually and surely diminish if the expectations of the wine-grower meet with expected support and encouragement.

We have yet for a moment to consider the influence exerted by the two kinds of cultivation upon the climate of Funchal. The cane is a succulent plant, ever-green, completely covering the ground, and demanding frequent irrigation. The vine, on the contrary, needs little water, is deciduous, and during the winter months leaves the ground and the corridors more or less uncovered.

In humidity, therefore, we should expect to find a considerable change—a considerable increase of dampness when the sugar was re-introduced, and a sensible return of dryness in districts where the vine is again dominant. Yet, after the most painstaking search, I can muster no evidence of any such change; nothing has been generally observed to confirm the supposition of an increase of humidity during the temporary supremacy of the sugar-cane, and the hygrometer has recorded no difference.

My own observations of the winter of 1861 accord in singular closeness with anterior and present results, though in that year the sugar-cane was supreme in the district of Funchal. Nor is this surprising when we consider the nature of the ground. The cane is grown for the most part upon steep acclivities, where the retention of water is impossible, and upon ground by no means swampy; and, moreover, the irrigation is by no means constant or so abundant as to exceed the requirements of interpolated crops. Other considerations will find their place in a subsequent chapter.

We have noticed some of the influences of the climate of Madeira as exerted upon vegetable organisms in the incessant stimulation of growth, and in the modification of characters peculiar to summer and winter. Analogous changes occur also in the life and habits of certain animals, although these, as we well know, resist acclimatisation more completely than do plants.

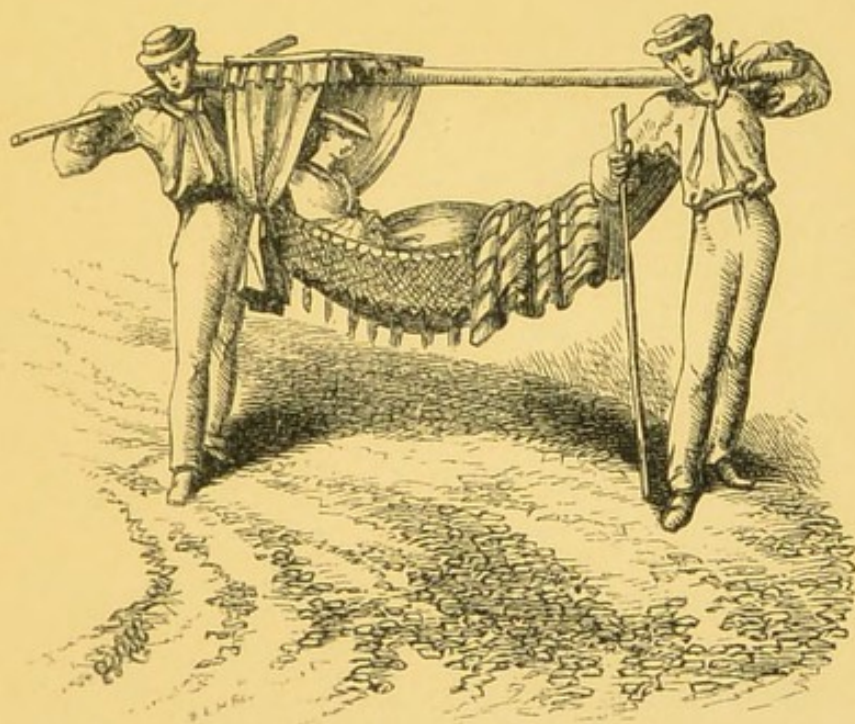
Thus, the common house-fly is present, actively, throughout the year, and no period is exempt also from the troublesome existence of a small ant. During the summer mosquitoes are numerous and irritating in Funchal; but mosquito curtains are never used, and the insect is seldom seen during the

winter. The hive bee knows no period of winter torpor, both temperature and food being sufficient for its vivacity in all seasons. This insect, if well managed, will continue to store up honey until Christmas; but, unless the combs are freely taken away in the autumn, the bee, in common with more intellectual and exalted species, becomes indolent in circumstances of affluence. A swarm of bees in August is as valuable as a swarm of bees in May.

In Madeira the law prohibits the keeping of bees in the neighbourhood of vineyards, so destructive are they to the ripe grapes; not so much for the reason that a great quantity of substance is consumed, as that the bee taps almost every grape with which it comes in contact. So long as the grape skin is entire no change takes place, but by the slow process of exsiccation raisins are formed, and the saccharine matter is unaltered. The minutest puncture, however, is sufficient to set up fermentation.

There is nothing in Madeira more venomous than a bee or a wasp; snakes and poisonous reptiles have as yet not found their way hither.

Lastly, birds of passage remain in Madeira throughout the year; the summer is not too hot,



THE HAMMOCK.



neither is the winter too cold for their constant presence; and this statement may convey to many people more practical information than all the details of the last and present chapters.

CHAPTER VI.

HYGIENIC AND MEDICAL CONSIDERATIONS.

IN the foregoing chapters it has been hard to avoid drawing deductions which, properly speaking, have their true place here, and the reader may doubtless have inferred much also which it has not been thought necessary to write. We come now to consider how the climate and general resources of the island are applicable to the diseases of those who seek its shores, and upon what classes the influence of Madeira is especially and most beneficially exerted.

At the outset the main characters already spoken of should be borne in mind; namely, the position between summer and winter, the local protection, the absence of extreme vicissitudes of temperature—the warmth of winter and the coolness of summer—the few days of rain, the amount of fine weather, and the general constancy with which all these are maintained. But there yet remains to be noticed that which, though very difficult to measure, is,

nevertheless, too important to overlook, the general influence of Madeira, in the extent and variety of its natural beauty, in grandeur of its scenery, in the vernal freshness of autumn, and the summer characters of winter, in the foreign aspect of things, in the maintenance of accustomed luxury amidst a strange and bounteous profusion, in the facilities which the place affords for general participation in its own peculiar enjoyments, and in the social attitude of the inhabitants. All these circumstances, and the like, exert a useful hygienic influence, some of them directly and physically, others remotely and morally.

And now let us first examine separately some of the hygienic—health-preserving—attributes of Madeira.

We may, perhaps, regard the facility for constant open-air exercise as one of the chief reasons for coming to Madeira, and to this, in combination with other means, we are enabled yearly to trace the happiest results. Under exercise appetite is begotten, the functions of digestion and assimilation rapidly improve, and the efficacy of other remedial measures is strengthened. The torpid general circulation of phthisis so often evidenced by cold hands and feet is marvellously restored; and the function

of respiration is invigorated by a pure unirritating air. Moreover, the various novelties thrust upon the stranger at every turn in a country half European, half African, and between the tropical and temperate zones, serve for a time, at least, to divert the mind from an accustomed groove of depressing thought to happier and more hopeful considerations.

In the winter, week passes after week often without a drop of rain; and the general tenor of fine weather is not often interrupted by conditions which debar an invalid his accustomed exercise; the especial shelter of Funchal, moreover, excludes the cold moisture of northerly winds, the days are therefore spent out of doors.

Of the varieties of exercise, walking is greatly restricted in Funchal, owing to the peculiar construction of the roads already mentioned, and the few public resorts of the city are also dull and unattractive; those, therefore, who adopt this mode of exercise and locomotion, generally betake themselves to the level ground westward of Funchal, or to the bridle and footpaths which usually accompany the levadas in their course above the town.

Horse exercise is the more common resource; the animals are well accustomed to the roads, and by

this means the delicious mountain air is easily attainable. The value of horse exercise in phthisis is well known, and though in former times over-rated as a specific remedy, it is, notwithstanding, productive of marked and early benefit.

In Madeira every horse is conveniently and constantly accompanied by an attendant, who gives all useful help, assisting in mounting, carrying one's umbrella or baggage, and brushing away flies from the animal.

The wheel carriages of Madeira are beneath notice; they are few, and only fitted to one unpaved level road.

The ordinary sedate conveyance is a canopied sleigh, drawn by a pair of bullocks.

No road is considered too steep, and with a vast amount of human noise and gesticulation the vehicle slips along easily, and with a fairly rapid motion.

The hammock demands more especial notice. This admirable conveyance, if not altogether peculiar to Madeira, is at least eminent here in perfection and usefulness. The hammock affords a valuable means of taking exercise of a passive kind; and passive exercise is often essential as the first step to more active movement.

Thus, except to those who may chance to be actually ill, and altogether incapable of any kind of motion, Madeira presents no bar to open-air life; and it may be said that we are indebted greatly to the hammock for the restoration of many a person who otherwise could never have left his apartment. In it one may be carried from a bedroom into the open air to partake of all its freshness, its sunshine, and general advantages, and the mind is thereby refreshed, and sleep also is invoked. In convalescence from various disorders this useful vehicle often permits us to make use of the invigorating pleasurable air at the earliest moment after active illness, and improvement rapidly follows; in cases also of advanced consumption, long after all hope of amendment has been resigned, the hammock ministers, I may say almost at the last, to the comfort of those who, though coming late, attain their final rest in a calm end of mitigated suffering. It has often been remarked of Madeira, that invalids in the latter stages of consumption are never debarred the enjoyment of social intercourse, or the pursuit of many occupations which at home are found to lie beyond the capabilities of persons much less affected; and this difference is largely referrible to the hammock. Many persons are thus carried

up the steep inclines which back the town to reach some inviting transverse level walk, whence some lovely view may be gazed upon or sketched; or pedestrian exercise may be taken at intervals after reclining repose. Moreover, the hammock is by no means the badge of a certain class, but is also much in use as a common mode of travelling, and is besides the ordinary conveyance of at least one physician.

Now, in Madeira, passive exercise is possible, and herein is a great advantage; the mildness of the climate is such as to admit invalids of all classes to their necessary share in its beneficial influence.

Patients who come from the south of France especially remark this quality. At Mentone, they tell me that open-air exercise too often demands of them, by reason of the chilly temperature, an amount of muscular exertion of which they are incapable, and that any form of passive exercise is attended with the inconvenience of cold extremities and other hurtful circumstances; and, moreover, that the genial warmth of the climate is limited to the direct rays of the sun; whereas the shade is cold and dangerous.

Now, it appears to me in perusing the writings of those who invite suffering humanity to the shores of the Mediterranean that they carry in their minds,

perhaps unconsciously, a sort of ideal climate which, if it could be written down, would very nearly spell Madeira. There is indeed very little similarity between the climates of Madeira and the south of France, inasmuch as there is no winter at the one and a decided winter at the other; yet, in the south of Europe, people are taught to apply the epithets "bracing," "stimulating," "invigorating," &c., to weather which, under the more homely equivalents, "cold," "wintry," "windy," &c., they commonly leave England to avoid; and, moreover, in the sound practical mode of treatment which prevails, much stress is laid upon sunshine, warmth, equability, and other influences which invalids are enjoined to pursue as far as possible with the help of south aspects, fires, Inverness capes, and other means, which in a degree might render even an English winter tolerable.

Boating in Madeira is generally restricted to exercise of a passive kind, and the constant presence of a certain amount of wave-motion limits the number of those who have recourse to it.

As regards exercise generally, I refrain from laying down any precise code, rather choosing to reserve the special adaptation of its varieties and amount to the exigencies of individual requirement. Advanced

invalids, however, should seldom be tempted far from the sea-shore and the immediate vicinity of the city ; and I may add that it is safe for no person frequenting Madeira for considerations of health, recklessly to ride out into the mountains, with their ever varying climates, without the advice and sanction of his physician.

The kind of clothing requisite in Madeira is that which is usual in spring or autumn at home, and must be regulated by ordinary habit and usage. For the voyage every precaution is necessary ; and care should be observed in leaving off customary articles of clothing upon first arriving at Madeira. I generally recommend the use of light merino next the skin, and the continuance of ordinary substantial over-clothing. The general aspect of English dress in Madeira is that of English summer. A good light umbrella is a constant requisite, not that the sun is dangerously intense, for sunstroke is unknown, but for general protection and comfort. The heavy white head gear which gentlemen sometimes adopt is superfluous and cumbrous.

The difference between the dress of the native people and that of the English is very striking. The latter, when long accustomed to a continued equability of temperature, become to some extent sensitive of

changes which are hardly noticed by new comers ; but the former are only at home in actual sunshine, and often, in the midst of foreign white waistcoats and light clothing, they muffle themselves in a garb which we should consider well suited to northern winter.

Situation.—In his choice of apartments the invalid should have in view as a main consideration an aspect which admits of a free entrance of sunshine during some part of the day ; and for this purpose it matters not, in this climate, whether his windows face the south, east, or west, though my own preference gives the above order of precedence.

Also, as a rule, it is well to be away from the ground. I speak chiefly of sleeping apartments. In ground-floor rooms there is often some sense of disagreeable closeness, and in the houses of Madeira the cubic space of the upper apartments is invariably increased by lofty domed ceilings. As to ventilation regard should be had to the supply of an abundance of pure air, to be admitted in such a manner as to flow insensibly through the apartment, and this may be always accomplished by a judicious arrangement of open windows. The external air seldom has a temperature too cold to be breathed unwarmed, and fires are seldom required. With regard to bedrooms, an efficient method of ventilation consists in

the establishment of a thorough circulation of air during the day, and the admission of a stream of sunlight; this last should be considered essential. At night, the upper part of a window may be generally left open with perfect safety and advantage, but in rooms the windows of which face the north, *i. e.* the direction from which the land breeze blows, greater caution is necessary.

Food of good quality and variety affords an advantage most important in its results to those who seek winter refuge in Madeira.

I observe that the ability to take animal and oleaginous food is by no means diminished here in the case of persons coming from northern climates, though the digestive powers are often, and at first more especially, overtaxed by an amount not requisite in the warmer temperate zone. The country people rarely take meat at all, and yet are capable of enduring toil of the most exhausting kind.

As in many instances of great profusion there is, perhaps, a certain lack of flavour in Madeira food, particularly in the case of vegetables, which are rapidly produced in all seasons; but the tables of the boarding-houses display ordinarily an abundance which the resources of few countries can emulate. Cooking, also, is here fortunately exempt from the

objection of greasiness so often to be encountered in foreign towns, and which is said seriously to disturb the palate for the due appreciation of cod-liver oil. The cooks in this island have been long educated to English habits and tastes, and though many new modes have been taught them, much also of their own native *cuisine* which is excellent has been retained.

The various kinds of food have been mentioned in a previous chapter.

As to stimulating beverages I am generally greatly guided by previous habit and instinctive preference. As a general rule I may say that, although a very small quantity only of any stimulant is necessary in this climate, yet there is nothing to deter from the continuance of a moderate habit. The lighter Madeira wines are commendable and generally enjoyable, but the now well-known wines of France and Germany are well suited to this climate. Malt liquors are not often taken in Madeira.

The public health of Madeira must receive a brief consideration. The island is largely over-populated; the people are in a great measure uncared for; and there is a neglect of sanitary precaution which, in circumstances less naturally favorable, would be disastrous. Yet it is only fair to remark of Funchal

that it possesses an external appearance and savour of cleanliness utterly unknown in many of the large cities of Europe, and to be emulated by few of our own towns in England.

The byways of Funchal also enjoy a cleanliness of condition equal to that of the main streets; and one may enter them without awakening unsavoury recollections of Rome or Naples. Much of this no doubt is due to an abundant supply of water and a sloping situation. But the embouchures of rivers and the regions immediately adjacent should be avoided, except after heavy rains; for the streams which in the upper part of the town run with pure water become near the sea mere large open sewers. The water of the town is copious in quantity, but, with the exception of one or two drinking fountains the water of which is excellent, the quality of the general supply is indifferent. In their course from the mountain ravines the *open* water-courses pass often through populous districts, intercepting every impurity and being exposed to the natural uncleanness of the people; running, moreover, beneath the loosely built walls of cultivated plots of ground, they receive in rainy weather whatever is soluble from the manured soil above.

It is to be hoped that the authorities will soon

see fit to cover over the main watercourses in all important situations, and thus be assured of a considerable immunity from diseases which now contribute largely to the general mortality, and also of a decided relief from the troublesome intestinal parasites which now generally affect the people of the lower classes. In the mean time every one should satisfy himself that his own drinking water is faithfully brought from one of the covered fountains, and more especially from the spring below the Governor's palace, as already described.

For the exclusion of epidemic sickness the people of Madeira, in common with their Spanish and Portuguese neighbours, rely implicitly upon isolation by quarantine, and recourse has been had to that measure sometimes upon very inadequate grounds and without due discrimination. Latterly, however, there has been no quarantine; and, further, the inhabitants, by the erection of a good lazaretto, have given a pledge of their willingness to extend to foreigners the hospitality of their shores even in times of sickness abroad.

As to the wisdom of quarantine in general circumstances, very much may be said for and against it; but, at the present time, when a certain amount of intercourse is deemed necessary between civilised nations,

isolation has become practically impossible. It would seem easy to isolate an island, yet, during the last epidemic of cholera in London, in spite of all restrictions, people who were strong enough to bear long journeys found their way to Madeira from infected districts by circuitous routes.

Quarantine is tolerable if something is really gained by its provisions : but an insufficient isolation is a vexatious restriction, acting often to the exclusive detriment of those who deserve exemption ; and affording a false security to those who otherwise, in the evident possibility of sickness, would anxiously look to the internal protective measures of cleanliness, good drainage, efficient water supply, and other sanitary essentials which, in England, exposed as the country is to the invasion of epidemics from without, have rendered life more valuable than in any other country.

The diseases of Madeira are for the most part those of our own country ; their mode of attack is similar, and their course when epidemic is severe and characteristic. Under ordinary circumstances, however, there is a marked mildness of form noticed by all writers, which is no doubt due in a measure to natural geniality of climate.

The diseases of warm climates are represented in

Madeira chiefly by a few varieties of skin affections and some forms of leprosy. The latter would appear in former times to have prevailed virulently and extensively, but it has become rare since a more profitable cultivation of the soil has improved the condition of the people, and since perhaps also the large exportation of embroidery has ameliorated the circumstances of the ill-fed poor to which class the disease was always limited.

The diseases of paludal malarious poison, ague, and intermittent fever are unknown, nor has this important immunity been influenced in the slightest degree by the cultivation of the sugar-cane.

Insolatio also, *i. e.*, sunstroke or heat apoplexy, an affection sometimes regarded as allied to this class, is altogether absent.

Yellow fever has never visited the island in any form.

No case of hydrophobia has been recorded.

Also, I would especially remark the notable modification in all inflammatory diseases and complications; the mildness of the eruptive fevers; the infrequency of hectic in consumption; and the general exemption of the people from the varieties of acute and chronic rheumatism.

The diseases most frequent among the native

people, both under ordinary and exceptional circumstances, are some of those which are now occasionally grouped under the term "mucous fevers," viz., influenza, hooping-cough, diarrhœa, dysentery, and cholera.

The first of these is excited by seasonal changes, slight as they are, and prevails occasionally to a considerable extent.

Hooping-cough has occurred sometimes with great force epidemically, but it is otherwise seldom met with.

Dysentery, also, has been destructively epidemic, though usually mild and tractable amongst the lower classes, and seldom attacking visitors. The more urgent forms come to Madeira from the coast of Africa with hepatic and malarious complications, and their treatment in this island is usually attended with the best results, recovery being rapid and complete.

Cholera visited Madeira in 1856 for the first, and hitherto only, time. Circumstances were favorable to its spread, the people were unprepared and panic-stricken, 8000 persons were rapidly destroyed, and the dead were with difficulty disposed of. The people are still unprepared; they are taught to rely upon means insufficient to give protection; and

should cholera at any time re-enter we may find that nothing has been learned from the former visitation, that the water supply is still open to all impurity and contamination, and that uncleanness and a general insalutary condition still exist in all their first force.

Diarrhœa as occurring in Madeira is a trouble with which we are more concerned inasmuch as, although varying in degree, it is not limited to any one class. As seen amongst the people of the land the affection is often severe and aggravated, and may be in a great measure ascribed to unwholesome water, and food inferior in quality and irregularly and inordinately taken. The mortality, as regards infants chiefly, is very great amongst the poor from this cause.

Amongst our own people diarrhœa is not uncommon during the first few days of their residence at Madeira. It is usually met with in the healthy and strong, who upon arrival hurry to see and to taste every novelty, and very commonly in those who have suffered from constipation during the sea voyage, and also those who, after the subsidence of sea-sickness, yield to voracious appetites at sea. A little general precaution upon arrival, rest, a cautious and rather restricted diet, and the avoiding of exposure

to the sun, will generally give all due protection ; the disease, moreover, seldom takes an active form, and yields readily to treatment.

Continued Fever.—Diseases of this order, though by no means especially frequent, are almost entirely of a typhoid nature, and it is impossible to disassociate them in their origin from the unsanitary surroundings which seem to appertain to their existence, and which limit them almost entirely to an uncared-for class. Generally speaking they attack in a form by no means severe, though occasionally fully developed cases may be met with ; but the mortality from fever is, I have every reason to believe, greatly aggravated by the usage of administering severe purgatives and by a mode of treatment generally enfeebling. In Madeira, fever is confined to no certain districts nor to the vicinity of certain cultivations, though, as a rule, I have generally met with most severe cases in valleys and low lying localities, the origin and propagation of the disease appearing to depend upon circumstances favorable to its generation and maintenance elsewhere ; but we know nothing here of the fatality of typhoid fever observed in England, which Dr. Budd states “ may be best measured,” “ by the fact that 20,000 persons annually die of it, and 140,000 more

are laid prostrate by it." Moreover, typhoid fever in Madeira, if I may trust the figures recently submitted to me, has become in recent years less common, at least as a cause of mortality, if not also in frequency of attack; the same circumstances which have to some extent bettered the general condition of the poor appear also to have mitigated the prevalence of their diseases; and this observation coincides with the impressions of those who reside here, and with the writings of my predecessors. Nor does the cultivation of the soil in the substitution of the sugar-cane for the vine appear in the vital statistics of the island to have exercised any influence upon the prevalence of fever. It is impossible to keep the terraced soil of the steep inclines of Madeira in a damp state; and the continued absence of diseases usually favoured by damp marshy grounds affords, *à priori*, reasons for concluding with respect to fever that which I have been enabled to state after a careful and general investigation. Whence, then, is the following assertion to be justified: "From recent information the climate of Madeira is deteriorated in consequence of the substitution of the sugar-cane for the vine since the ravages of the *Oidium* destroyed the productiveness of the latter. In the cultivation of the sugar-cane

constant irrigation is required which keeps the ground in a damp state, and the evil effects have already become manifested in the prevalence and mortality of fever in the island.”—‘The Climate of the South of France:’ Williams.

I may add that, in the six years of my residence in Madeira, three fatal cases only of any kind of fever have occurred amongst the English people, and that their liability in this respect is altogether insignificant.

Diseases of the tubercular order are by no means rare amongst the people of Madeira, though their presence is probably overrated by the confusion of chest affections generally with those belonging especially to a specific cachexia. The greatest amount of chest disease occurs amongst the labouring people, who, after excessive toil and exposure, remain in wet clothes, and who inhabit insalubrious dwellings in neglected localities. Pneumonia in a low asthenic form is very common and destructive in these circumstances, and in the treatment for it there is the same neglect of invigorating measures we have noticed in the case of fever. Pulmonary tubercular disease is comparatively seldom seen in the upper classes of the Portuguese, and the general aspect of the population gives no obvious evidence of its

presence; but amongst the poor in all districts consumption is not uncommon, and the women who work at embroidery are, perhaps, pre-eminently liable to its most severe and intractable varieties.

By far the most common manifestation of tubercular disease is to be seen in the frequent mesenteric affections of ill-fed young children, and I have reason to believe that the mortality in these cases, complicated with diarrhœa, is very great.

We have yet to notice the influence of the climate of Madeira in preventing, mitigating, and arresting the maladies of those who shun northern winters, and the varieties of disease likely to receive especial benefit.

This climate has been principally observed in the treatment of chest complaints, but incidentally the behaviour of other diseases has been largely noted, and the decided benefit obtained by persons afflicted otherwise than by phthisis has led latterly to the reception of a variety of cases. Some of these I shall here point out. At the commencement we may notice the assistance which is here given in the difficulties of pregnancy and child-birth. The most trying circumstances are invariably modified; any danger of abortion is lessened; and further, the process of parturition is facilitated. "In sorrow shalt thou bring forth" is here leniently interpreted.

The troubles also of infancy and childhood are, for the most part, admirably evaded; the teeth are cut without an untoward symptom, and the ordinary diseases of children are unfrequently met with. The climacteric periods also of growth, development, and age are well tided over. It has been said, however, that children brought up in this country are more amenable to the changes of an English climate in after life than if they had been reared in circumstances of greater natural variation. This is probably true to some extent, though I am unable to offer any distinct corroboration; I conceive, however, that the fact of a large number of children nursed in Madeira being the offspring of enfeebled parents may, partly at least, be accepted in explanation.

Patients convalescent from fevers and other diseases, and particularly those in whom there is reason to dread the foundation of constitutional disease, may well spend a winter in Madeira; as also may those who are in the like jeopardy from long-sustained mental distress or undue exertion. There are few, however preoccupied, who can resist the diversion afforded by the natural beauty and loveliness of the island of Madeira; and who do not, in the temporary severance from customary anxiety and

labour, enter fully into the contemplation and enjoyment of unwonted rest and comfort.

As regards diseases likely to be benefited by general uniformity of meteorological circumstances, I would remark the advantage which this climate has lately been found to yield in the management of several varieties of renal disease. I speak principally of incipient Bright's disease, albuminuria, and of an unhealthy state of action remaining after the desquamation of scarlatina.

Much good in such cases is to be attributed to general circumstances of open-air life and unfatiguing exercise; but a large share of derived benefit may be directly referrible to a climate in which the excretory function of the skin is liable to no severe or sudden check, and where, consequently, the kidneys are exempt from undue stress and noticeable variation. The same causes may be inferred to contribute also to the marked immunity enjoyed in this climate from gout and rheumatism; and, in regard to the latter, with great reason, if we are to believe the specific poison to be identical with a natural excretion of the skin unduly retained.

Of those diseases for which Madeira is chiefly sought let us first glance at bronchitis, and that

variety especially where winter cough and exaggeration are prominent features.

Patients thus suffering may be confident of relief or complete exemption during the winter in this climate; and the collateral improvement in general health, the rest given to an affected organ, and the establishment of a more healthy action of excreting organs, are productive of a benefit not merely transient, but also subsequently protective against the cold weather of an English climate.

The type of bronchitis, whether it be dry or accompanied with free secretion, affords, as regards this climate, but little indication of suitability or of the probability of improvement, since the compensating power of other organs, as here developed, has to be also considered.

Patients suffering from asthma who have come under my notice have, in general, derived benefit, and those of them especially whose residence has been fixed considerably above the sea-level. I may say the same of emphysema, more particularly of that variety complicated with spasm.

But the fame of Madeira has been established mainly by its beneficial influence upon pulmonary tubercular disease; and it is not too much to suppose that some instance of marked improvement

obtained in this island may have, at some time or other, come to the personal cognizance of every reader of this book.

In coming to Madeira, invalids, whatever may be the nature of their disease, certainly attain one great object for which they leave home, namely, they avoid winter ; they exchange, with no uncertainty, the frost, cold, damp, and inclement variability of the north for a climate mild, pleasurable, and healthy, where winter is unknown. And we know of no climate on this side of the equator which presents similar advantages.

Of the most favorable Mediterranean resort, it is said authoritatively—"It is well to recollect that in such a climate in the warmer temperate zone, winter is not by any means avoided. The descriptions of the winter climate of Nice, Cannes, Hyères, and Italy in general, contained in most books of travel, works on climate, and guide books, are mere poetical delusions. The perpetual spring, the eternal summer, the warm southern balmy atmosphere described to the reader in such glowing terms, only exist in the imagination of the writers. Although there is so much sunshine, so much fine weather, such immunity from fog and drizzling rain, we are still on the continent of Europe, with ice and snow behind for more than a thousand miles to the north

pole ; it is still winter. Wind, rain, a chilly atmosphere, and occasional cold weather, with snow upon the mountain and flakes of ice in exposed situations have to be encountered. It is well, therefore, that the invalid traveller should be prepared to encounter them. Otherwise, anticipating an Eldorado, balmy zephyrs, perpetual sunshine, and an ever-smiling nature, he is disappointed.”*

Such a difference is at least decided, whatever may be its import, the estimate of which I must leave to my readers. I may say, however, that the suggestion of cold or cool temperatures in the treatment of phthisis is meeting with little favour at the present time from the most experienced of my brethren in London ; and it appears to me that the chief advocates of that plan would do well to confine their recommendations to patients labouring under the tubercular cachexy rather than include persons who present those secondary lesions and consequences of the already developed disease which occupy so large a portion of our attention.

It is perhaps not altogether foreign to the present portion of the subject to state that a few years ago, for a time, Madeira received a few only of her customary winter visitors. The combination of certain

* ‘ Winter in the South of Europe.’ By Dr. H. Bennet.

causes, namely, an exclusive quarantine, some difficulties respecting the status of English physicians, and a general want of efficient communication happening at an opportune moment, led to the definite shutting out of invalids. At the same time the claims of the Mediterranean were strongly urged, and people were easily led to a region highly recommended, always easy of access, and not completely severed from European intercourse. The temporary declension of Madeira doubtless advanced greatly the public knowledge of Mentone, and I believe that by-and-bye we shall see the reputation of the latter to have culminated at about that period in the public mind.

The causes, however, of a temporary digression from Madeira have been since removed. Steam communication has become abundant, and a complete line of railway has been for some time working through Spain and Portugal. Moreover, quarantine and other restrictions have ceased, and those who have passed the 'winter of their discontent' elsewhere, are now returning to circumstances of greater geniality.* In the absence of reliable information the

* I feel bound to acknowledge in this place the valuable assistance of Mr. R. Knowles, of Lisbon, in a matter relating to the welfare of Madeira.

desertion of Madeira was variously accounted for. Some persons invented a fever with a dangerous mortality. Another, Dr. H. Bennet, writing in the zenith of his Mentonian prosperity, described the then practically defunct climate of Madeira as "seeming rather suited to the requirements of a bygone period of the professional mind, when pulmonary consumption was considered a species of inflammatory disease, than to satisfy present requirements, when phthisis is considered a disease of debility, of anæmia, of organic exhaustion, and of defective nutrition."

Dr. Williams* has seen fit to reply to this view thus: "Now, although we admit that the advance of pathology has thrown light on both the nature and treatment of consumptive diseases, we can hardly allow there is such a change in the professional mind as to deny altogether to inflammation any share in producing or aggravating these maladies. It is still the opinion of those who have had the largest experience that a considerable number of cases of phthisis take their origin from inflammatory attacks; that intercurrent inflammations are the most common causes of acceleration of the disease in this country; and that a climate which supplies

* 'Climate of the South of France.' By Dr. C. T. Williams.

fresh air without cold, damp, and sudden changes, owes much of its salutary influence to its excluding these causes of inflammation."

Here, then, we have two respectable opinions, the first stating that the climate of Madeira did formerly satisfy the requirements of the professional mind, and the second that the requirements of the professional mind are not greatly changed. The public, however, may be content to remember that the opinion of a very celebrated physician, Sir J. Clark, upon the superiority of Madeira "did not rest merely upon a consideration of the physical qualities of the climate," but "was founded upon the experience of its effects," and need not trouble to seek further to understand the varying requirements of the professional mind.

However "Winter in the south of Europe" may represent the professional mind, I would commend to all the perusal of a book which is so eminent an instance of the kind of literature apparently suited to the public mind at the present time. The book is full of information; pleasantly and authoritatively written; and I conceive would have attracted a favorable if transient current of opinion towards the climate of any place with the name of which it might have chanced to be labelled.

The interpretations of certain natural phenomena,

though sometimes obsolete, represent doubtless the writer's sagacious estimate of the incapacity of the public mind to receive in the present age views which Tyndall and others have prematurely advanced ; and it is only reasonable when addressing a mixed class of readers to abstain from the utterance of intricacies only fathomable to men of science.

It is far from my purpose to attempt in this place any full comparison of Madeira with the shores of the Mediterranean.

The latter district will perhaps always attract a large number of general winter visitors, and of such invalids who, though they may with safety encounter an English winter, yet find it agreeable and beneficial to migrate. But Madeira has every reason to be satisfied with her retrospect, her present, and her prospects, and whenever it may become necessary to write an epitaph we will say—

“Lector, si monumentum requiris circumspice.”

Of the stages or degrees of consumption likely to be most benefited by the climate of Madeira, all physicians who have hitherto practised here agree in recommending its trial in a very early period of the disease, as that in which the greatest amount of good may be expected.

My own experience also leads me to concur in the view that cases of this kind almost invariably derive benefit. Every day I see the most marked amendment in the early stages. The percussion resonance, chest movements, and other physical signs, recover, in some cases to a marvellous extent, their healthy status; and patients are cognisant of improvement by facility of breathing, loss of cough, and other local signs, which are well corroborated by a large increase of weight and general healthiness of tone. Yet there are cases of this class in which the course of disease is different, and every physician is acquainted with them.

In these, even though at first the amount of lung tissue involved is not necessarily great, the progress of the malady is rapid and irresistible, and the most careful treatment tends little to avert or delay a fatal termination. Such cases no doubt largely contribute to the immense general mortality from consumption; and the complete powerlessness of medicine over them has led men of late to look to the development of those measures of precaution and hygiene which have aimed, already with great success, at the prevention of the tubercular cachexy.

Early cases of consumption, in general, do well at Madeira, though, occasionally, instances of the

above nature are met with. The more common course of phthisis unarrested in its first progress is to fall into the ulterior conditions of softening of the tubercular deposit, with the occurrence of secondary inflammations, and excavation of the lung tissue. In these, the more advanced stages of consumption, a patient is placed at Madeira in circumstances which powerfully second a judicious and careful plan of treatment. He is able *at once* to secure the advantage of some kind of open-air life and exercise; and, moreover, he is, to a very great extent, secure from the collateral complications of an inflammatory character, whether of bronchitis or pleurisy, which are so often known to constitute secondary lesions of much gravity, and direct causes of acceleration in the progress of mischief. In the less severe of these cases the disease is not unfrequently arrested, and in very many life is much prolonged.

In the more advanced cases physicians at home generally persuade their patients that climate can avail them nothing, and that rather than waste their remaining energy in fruitless emigration, they should resign themselves to what is inevitable in the midst of friends and home comforts. Neither is any better prospect held out to them at Mentone, where

patients of this class, in the words of a writer already quoted, are said to "drop off in the course of a winter as they would have done at home."

In this island also many of such patients die, but some of them recover; and I think that the number of those who rally is large enough to justify the option of Madeira being given to any person in advanced pulmonary disease. It is by no means uncommon to receive persons in extreme sickness, whose cases had been deemed absolutely hopeless at home, and to find that they eventually revive. The earliest climatic influence in such cases is to be observed in the control of hectic fever, nocturnal perspiration, and cough; and those have the best prospect of amendment whose tendency to a fatal termination is by successive attacks of bronchitis, pneumonia, or pleurisy, and also by the gradual advance of exhausting debility.

Thus, then, we have seen that Madeira is very beneficial in cases of early consumption, a stage in which the disease is generally most tractable, and which may be dealt with also, to some extent, in climates possessing less natural advantages; and moreover, also, that the patients in more advanced and intractable stages for whom no hope is held out from climates of inferior efficacy, may derive consider-

able encouragement from the experience of this island.

I have mentioned already in an earlier chapter the efficacy of Madeira in cases of impending phthisis, often to be observed in those who accompany their friends or relatives hither, and are thus perhaps unconsciously saved from the development of disease.

Thus much respecting the stages of phthisis; but there are besides several varieties which, though hard to define, are recognised at once by the practised physician as suited or unsuited to the district especially known to him, and therefore I would recommend any person who may be deciding to winter in a given climate to seek first, if possible, the sanction of a physician practising in that climate. Many of these are to be found in London during the summer, and it is their aim and interest to receive only favorable cases.

Let no one suppose that in coming to Madeira he may cast aside all due precaution, or abandon the system of patient treatment to which he has been subjected at home; let him rather understand that he is now placed in advantageous circumstances which greatly increase the force of any effort he may make towards recovery; and, moreover, that

it is necessary for him to second, by personal prudence and medical help, the remedial influence under which he is situated, otherwise every object to be gained by his exile may be lost. Furthermore, the advantages of a superior climate are not only those discernible immediately by outward and visible improvement, though these are sometimes very great; a most important amount of benefit is to be measured also by the retarding of disease in its onward progress, an effect at first occult and negative in character, but often leading to manifest and positive improvement.

Immediately on his arrival an invalid should suffer himself to be guided entirely by his physician, keeping himself well within prescribed limits, and not allowing himself to be led for a moment either by those who, upon an apparent similarity of circumstances, venture to advise him, or by those who in advanced improvement are enjoying greater scope. In the treatment of phthisis some modification is at first necessary in many respects; and the routine of life, the quality and amount of exercise, the situation, and many other points, have to be regulated. In Madeira patients sleep readily and without difficulty; the use of morphia I am generally able at once to discontinue. The ability to take cod-liver oil

is maintained, and, moreover, patients who have become accustomed to that remedy cannot easily forego it; yet as a rule it should be discontinued for a day or two upon arrival. Nevertheless, persons who have not been able to take the oil at home, and who have progressively emaciated elsewhere, thrive often marvellously without it in Madeira.

The period of sunset has already been described, and will have been seen to present no sudden depression of temperature. Yet I would here suggest to those invalids who would reap the maximum amount of good that they avoid the minimum causes of evil.

The Madeira summer must not altogether escape our notice, as affording a climate long held in high estimation, and more moderate, to my mind, in amount of heat than is the winter in amount of cold. The localities generally resorted to have been mentioned. It is possible either to hire houses in the mountain districts or to join the establishments opened in summer by some of the town boarding-house keepers. Formerly a great number of invalids who purposed spending a second winter in Madeira remained in the island during the intervening summer. At the present time, however, the greater part avail themselves of the rapid and fre-

quent communication with England, and few remain. Nevertheless, the mountain summer of Madeira is well worth consideration, and is to be strongly recommended in some of those cases where, although the progress of disease has been arrested, the general stability is precarious, and much headway has not been made. I would also include as suitable for the Madeira summer the cases of those to whom the termination of winter is the end of a beneficial discipline, who have no settled resting-place at home, and who are likely to fall again into circumstances which in the beginning were the exciting causes of their trouble.

In another chapter I have mentioned a little village situated at the east end of Madeira, commonly frequented in the spring months, and with much benefit by those who have passed the winter within the protecting walls of Funchal. During the prevalence of north easterly winds Sta. Cruz is unprotected; but in favorable weather the air is light and stimulating, affording a salubrious change. It is always possible, also, to make similar spring changes in the environs of Funchal with results equally good.

The climate of Sta. Cruz, in the Island of Teneriffe, is universally well spoken of as offering a light, invigorating air, and a marked equability of a rather

warm temperature. Several steamers touching at Madeira call also at Teneriffe, and the voyage is accomplished in about thirty hours. After Madeira, however, the surrounding scenery is poor and uninviting, and the place is also wanting in the comforts and accommodation requisite for invalids. In the spring months Oratava, a small town on the north side of the same island, may be safely visited,—a situation possessed of considerable natural beauty, and also of a cool and pleasant climate.

As a rule, I find that patients derive but little good from these distant excursions. They are too apt, in the first exhilaration of new circumstances, to throw off habits of judicious restraint, and to run into imprudence, and, moreover, there is a lack of necessary supervision. Invalids generally will do far better to remain quietly in a place which is steadily benefiting them, and therefore giving no occasion of discontent, than for the gratification of mere restlessness to tempt disaster. It is a mistake to suppose that invalids pass their time in Madeira in a state of solitary and painful exile; it is rather to be observed that they fall readily and agreeably into the new life opened to them, occupying themselves in a thousand varieties of idleness, and viewing with dejection the approach of their time of departure as

the awakening from a pleasant dream, the fading of happy illusions, the dawn of reviving anxieties, and the return to life in its stern realities.

The time for leaving Madeira is the season at which northern climates become tolerable; and none—but least of all those who reside in exposed districts—who would avoid the treacherous weather of spring, should venture home earlier than the end of May.

Lastly, as a thousand considerations have been omitted in this book, so also in as many unwritten rules must an invalid depend upon himself. In Madeira he will have set before him abundant instances of gratifying benefit, and also not a few in which expatriation has been of no avail. In consumption, under the most favorable circumstances, it is much easier to recede than to advance; and it will be noticed that the best examples of recovery have been greatly furthered by self-help.

Many who have sought Madeira in grave adversity have been enabled eventually to resume life in its most active employments and most arduous duties. Many still seek Madeira; and in their retrospect they will linger upon the period of their convalescence in an hospitable foreign land, with its hopes and uncertainties, its pleasures and restrictions, with a calm and longing satisfaction.

APPENDIX.

THE SEA VOYAGE TO MADEIRA.

THE commencement of the Madeira season is, generally speaking, the end of summer weather in England; and, as a rule, invalids may do well to leave home before the first signs of decided cold weather set in.

Madeira is at no time unfit to receive her visitors, and some of the most charming weather is to be enjoyed often in the autumn months.

In September and October the hills above Funchal offer most salutary climates, and after the first rains, which occupy variably a few days in that season, have descended, the city becomes pleasantly cool and agreeable; but the weather in Funchal during the first approach of rain is often oppressively close and relaxing.

Early in October a calm sea and a prosperous voyage may be expected, and the passage is generally accomplished in six days; but the voyage later, though often favorable throughout, is not seldom attended during the first two or three days with the

discomfort of unquiet weather; yet it must be said, and especially with regard to the mail packets, that any serious delay in the arrival of steamers has of late become very unfrequent even under adverse circumstances.

Eight steamers, calling at Madeira both in their outward and homeward passages, now leave England regularly every month, as follows :

Port.	Monthly date.	Line of steamers.	Address of owners or agents.
Liverpool	4th, 14th, 24th	African R.M. Packets	14, Leadenhall Street, London.
			23, Castle Street, Liverpool.
Southampton	8th and 23rd, calling at Plymouth two days later	Union R.M. Packets	23, Leadenhall Street, London.
			T. Hill, Southampton.

The above, for the most part, carry surgeons and stewardesses.

Glasgow or Liverpool	1st	British and African Steamers	2, Brunswick Street, Liverpool.
			91, Buchanan Street, Glasgow.

The two following call at Lisbon, sailing thence on the 5th and 15th of every month respectively.

Hull	—	Empreza Lusitania	Bailey and Leetham, Hull.
London	6th	Maria Pia	McAndrew and Co., Bond Court, London.

In addition to the above there are occasionally other steamers which call by special advertisement, and amongst them those of

the Good Hope line¹ from London and Falmouth. (Agency—117, Leadenhall Street, London.)

The rates of passage to Madeira range from £12 to £20 for first-class single fares, and the Liverpool lines issue return tickets at a reduced rate available for six months.

The direct voyage is to be recommended to all, and especially to invalids in the latter stages of consumption or in circumstances of great debility. The digression to Lisbon involves almost necessarily some fatigue and excitement, and there is little in that city to attract by diversion or amusement; moreover, a break in the voyage, with a couple of days on shore, often involves a second ordeal of sea-sickness and discomfort.

The principal hotels in Lisbon are the "Central," near the Tagus, and the "Braganza," at a higher elevation; Mrs. Durand, also, in the Rua dos Flores, has a house well situated and adapted to the requirements of invalids and families.

In leaving England it is well to go down to the port of embarkation and remain quietly in some good hotel a night before sailing, and to see also, if possible, that all baggage is properly disposed of. At the last moment all is confusion on board—the decks are wet often and encumbered, and, generally speaking, little attention can be had until the steamer is fairly under way.

The sea voyage to Madeira must always be regarded as an important and favorable consideration. It affords a safe and unfatiguing mode of transit, and is generally productive of much positive good. Invalids in the latter stages of consumption, to whom railway travelling has become difficult or impossible, are thus enabled to reach Madeira without undue exertion, and the vessels which carry Madeira passengers are now fully furnished for their especial wants.

On the first day of the voyage there is generally some sickness and nausea, and during that period I would recommend a recumbent position, the utmost stillness, fluid food in small quantities frequently repeated, and the abstaining from all medication. Sea-sickness is very rarely known to be hurtful, and I may say that very few consumptive persons suffer seriously from it in the voyage to Madeira. On the second day the symptoms are found to have subsided, and on the third day the patient is quite well. His appetite has now become insatiable, and, no longer prostrated, he emerges from his cabin to find everybody sunburnt and inspirited, the air soft and invigorating, and the ship darting silently through the deep dark-blue water of a southern sea, under a sky from which all haze and gloominess

have departed. The latter part of the voyage is too short.

THE OVERLAND JOURNEY.

Of the overland journey through France, Spain, and Portugal, to Lisbon, I am not competent to speak from experience, and hitherto that route to Madeira has not been much frequented; as yet it would appear to be unadvisable for any persons other than those who are competent to endure the most exhausting railway travelling in Europe. Yet that line of communication is already well established, and cannot fail by-and-bye to be greatly developed; and, moreover, Lisbon is gradually becoming the principal outlet and point of departure from Europe for the growing settlements of South America. The sea between Lisbon and Madeira is generally calm, warm, and pleasant to traverse, and is seldom subject to enduring storms.

PASSPORTS.

No passport is requisite in coming to Madeira; but, on arrival, it is necessary to obtain a "permission to reside," for which a small fee has to be paid. On leaving the island a somewhat heavier fee

is exacted, and no one is allowed to embark without a passport or vise. A British Foreign Office Passport avails nothing in Madeira, but that respectable document is universally recognised upon the continent, and its presence may be useful to those who return from Madeira through Spain and Portugal.

MONEY CURRENCY.

The money current in Madeira is chiefly Spanish, English, and American; Portuguese coin being represented by copper money only. The computation is decimal in character, the unit, *reis*, existing hypothetically as the $\frac{1}{5}$ th of a farthing.

PORTUGUESE COINS.

Copper.

Reis.			£	s.	d.
5	Cinco-reis	.	0	0	0 $\frac{1}{4}$
10	Dez-reis	.	0	0	0 $\frac{1}{2}$
20	Vintem	.	0	0	1

SPANISH COINS.

Silver.

50	Meio Testaõ, or half-bit	.	0	0	2 $\frac{1}{2}$
100	Testaõ, or bit	.	0	0	5
200	Dois Testões, or pistareen	.	0	0	10
500	Half dollar	.	0	2	1

Silver or Gold.

1,000	Pataca, or dollar	.	0	4	2
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SPANISH COINS—*continued.*

		<i>Gold.</i>		
Reis.		£	s.	d.
2,000	Two dollars . . .	0	8	4
4,000	Four dollars . . .	0	16	8
5,000	Five dollars . . .	1	0	10
8,000	Eight dollars . . .	1	13	4
16,000	Sixteen dollars . . .	3	6	8

ENGLISH COINS.

		<i>Silver.</i>		
60	Three pence . . .	0	0	3
80	Four pence . . .	0	0	4
120	Six pence . . .	0	0	6
240	Shilling . . .	0	1	0
480	Florin . . .	0	2	0
600	Half-crown . . .	0	2	6

		<i>Gold.</i>		
2,400	Half-sovereign . . .	0	10	0
4,800	Sovereign . . .	1	0	0

AMERICAN COINS.

		<i>Silver.</i>		
50	Half dime . . .	0	0	2½
100	Dime . . .	0	0	5
250	Quarter dollar . . .	0	1	0½
500	Half dollar . . .	0	2	1

		<i>Silver or Gold.</i>		
1,000	Dollar . . .	0	4	2

		<i>Gold.</i>		
2,500	Two and a half dollars . . .	0	10	5
5,000	Five dollars . . .	1	0	10
10,000	Ten dollars . . .	2	1	8
20,000	Twenty dollars . . .	4	3	4

POSTAL REGULATIONS.

The prepaid rates of postage to and from England are as follows :

UPON LETTERS.

<i>Via</i> France . . .	6 <i>d.</i> for every $\frac{1}{4}$ ounce, or fraction thereof.
By mail packet or	
private ship . . .	6 <i>d.</i> „ $\frac{1}{2}$ „ „

UPON NEWSPAPERS.

Upon every newspaper duly registered for transmission abroad, or posted within fifteen days of publication—

<i>Via</i> France . . .	3 <i>d.</i> for every $\frac{1}{4}$ pound, or fraction thereof.
By mail packet or	
private ship . . .	2 <i>d.</i> „ $\frac{1}{4}$ „ „

UPON BOOK PARCELS.

(*Subject to published directions.*)

<i>Via</i> France . . .	4 <i>d.</i> for every $\frac{1}{4}$ pound, or fraction thereof.
By mail packet or	
private ship . . .	3 <i>d.</i> „ $\frac{1}{4}$ „ „

No postal address should be superfluously encumbered. Nothing more than “Madeira” is requisite, and “Funchal” and the names of Quintas afford no assistance. The delivery of a letter to a person staying at a well-known boarding house may, however, be facilitated by “Care of Mr. A—,” the proprietor of the house.

Letters may be posted *in London* on the 3rd, 13th,

and 23rd of every month, for the Liverpool mail packets, and also on the 9th and 24th for the Cape steamers from Plymouth, but one day later when these dates fall on Sundays. Due allowance must be made for time in remote country districts, and, moreover, the ignorance of country post-masters may be enlightened by "*viá* Liverpool" or "*viá* Plymouth" upon some conspicuous part of the envelope.

Intermediately, letters may be sent to Madeira overland to Lisbon, addressed "*viá* France," and may be posted in London about the 31st or 1st of any month. Mails are also made up for ships as specially advertised.



