The effect of climate on tuberculous disease : being, with additions, the essay for which the Fiske Fund Prize was awarded. With an appendix of corroborative observations and notices of several places of winter resort.

Contributors

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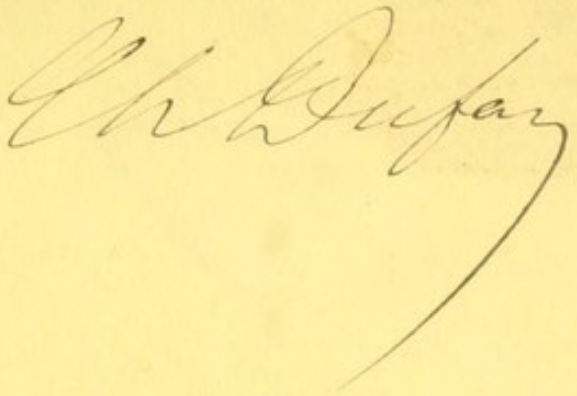

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Ch Dufay

THE

EFFECT OF CLIMATE

ON

TUBERCULOUS DISEASE,

BEING (WITH ADDITIONS) THE

ESSAY FOR WHICH THE FISKE FUND PRIZE

WAS AWARDED TO

EDWIN LEE, M.D.,

CORRESPONDING AND HONORARY MEMBER OF SEVERAL MEDICAL ACADEMIES AND SOCIETIES OF FRANCE, GERMANY, ITALY AND SPAIN.

With an Appendix of

CORROBORATIVE OBSERVATIONS

AND NOTICES OF SEVERAL

PLACES OF WINTER RESORT.

LONDON:
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PREFACE.

THE curability of tuberculous disease of the lungs being undeniable, notwithstanding the general failure of the endeavours to attain the desired object by purely medicinal means, and especially by the adoption of the empirical modes of treatment, so constantly obtruded upon the notice of the public by means of the newspapers, the attention of the best-informed members of the medical profession has naturally been more particularly directed of late years to those hygienic agencies, which, by effecting favourable modifications in the constitution, would seem to be best calculated to strike at the root of the evil. Among these agencies, climate necessarily occupies the first place; yet, owing

to the difficulties experienced in obtaining impartial information respecting the peculiarities of particular climates, and their action upon diseased conditions of the system, the study of medical climatology is still in a very backward state. A distinguished scientific writer remarks that, "That part of meteorology which has for its object the study of atmospheric influences upon man in health and disease, meteorological hygiene, will some day be one of the branches the most cultivated, as it is one of the most useful of the sciences relating to the vital organization;"[1] and, in proportion as the study advances, there is every reason to expect that much more will be accomplished, than heretofore, towards the prevention and removal of several diseases, intractable to ordinary medication. The question of the influence of climate on the course of pulmonary tuberculisation, has, indeed, of late attracted a larger share of attention than at any previous period; and prizes were almost simultaneously offered, by two medical bodies, for the best essays on the subject—the Acade-

[1] M. Babinet (de l'Institut). Etudes sur les Sciences d'Observation. 1856.

mie de Médecine, and the society which has honoured my essay with its approval. The French version was sent in to compete for the prize of the Académie, which, however, was awarded to a naval surgeon, (an abstract of whose Memoir is given in the Appendix,) who has treated the question more particularly with reference to the effect produced upon the disease, by a protracted residence in hot and unhealthy climates, as manifested among the troops and sailors stationed in the French colonies, and on the adjacent seas, from which data the author draws conclusions unfavourable to the remedial efficacy of warm climates generally, the justness of which is, however, disproved by the experience of physicians, who have had the best opportunities of forming an accurate estimation of the value of climate in the places resorted to by patients labouring under the various forms of pulmonary disease.

In the following pages, it has been my chief object to attempt to elucidate the mode in which a residence in suitable climates acts most beneficially in eradicating the disposition to pulmonary consumption, and in arresting the pro-

gress of the disease when existing, with a view to the employment of this remedial agent upon more certain indications, in particular cases, than heretofore. The essay was published last year in the "American Journal of Medical Science." It is now enlarged by additional observations of other writers, as well as of my own, and by fuller notices of some of the places of winter resort.

6, Upper Hyde Park Street,
November, 1857.

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EFFECT OF CLIMATE

ON

TUBERCULOUS DISEASE.

CHAPTER I.

PRELIMINARY REMARKS.

A subject of greater importance than that of the effect of climate on tuberculous disease could scarcely have been chosen from the whole range of medical science, for the consideration of competitors for the prize offered by the trustees of the Fiske Fund—both on account of the generally fatal termination of tuberculous diseases, when seated in a vital organ, and the inefficiency of medical treatment, as well as of the prevailing deficiency of knowledge among the profession respecting the action of climate, and of its capability, when employed with discrimination, and before disease has advanced too far, of frequently arresting its progress, and sometimes of effecting a cure. It is true we possess many valuable monographs of the climates of particular localities and districts, and of their effects

upon diseased conditions of the system, but I am not aware that there exists any work, either in the English, French, or German languages, treating of the remedial action of climate in its more general bearing. I propose, therefore, upon the present occasion, to consider the mode in which climate acts most beneficially in preventing the occurrence of tuberculous disease in the lungs, and removing it where already existing; the observations which I have to offer upon this point being equally applicable to tuberculous affections of other parts. In order, however, to enable us to form a just estimate of the *modus operandi* of this remedial agent in cases of tubercles of the lungs, it will be necessary to take a brief survey of the opinions which have been expressed by various authors respecting the nature of the disease, and of the causes which most frequently produce it; for it is only by having correct ideas of its pathology, and by endeavouring to neutralize the influence of its predisposing and exciting causes, that we shall be likely to arrive at more satisfactory results than have been hitherto attained under a system of purely pharmaceutical and often empirical treatment—which, however useful in affording relief for a longer or shorter period, has tended but little, if at all, to diminish the amount of mortality occasioned by the prevalence of pulmonary consumption in most parts of the civilized world.

The curability of consumption can no longer be reasonably questioned; the fact having been verified

in numerous instances of persons who, after having presented all the general and local indications of its existence in various stages of structural lesion, have recovered—living in the enjoyment of tolerable health until a more or less advanced age, when on their succumbing under some other disease, the examination, *post-mortem*, has revealed the traces of the former malady. Laennec remarked this occurrence on several occasions. MM. Ferrus and Cruveilhier state from the result of their observations upon the bodies of old men and women, who died at the large hospitals, Salpétrière and Bicètre, that it is not uncommon to find excavations and other consequences of tuberculous disease which had existed at a former period. More recently, M. Beau stated that 157 out of 160 women who died in his wards in the Salpétrière had cicatrices in the summit of one or other of the lungs, which he considered to be the remains of tubercular disease; most frequently the summits of both lungs were affected.[1] M. Prus likewise found, on examining the bodies of old people, in a large proportion of them traces of former tuberculization of the lungs; in some cases the tubercles had disappeared, leaving cavities lined with a membrane of new formation, and communicating with the bronchia; in other cases there were fibrous or cartilaginous cicatrices; in others, again, the tubercles sometimes encysted, at other times not, were infiltrated with a large amount of chalky, calcareous, or ossiform substance.

[1] Compendium de Médecine Pratique, art. Phthisie.

If, therefore, there is reason to believe that pulmonary consumption is not unfrequently cured in persons of the lower classes, who have not the means at command of being suitably treated, it can scarcely be doubted that cures are of more common occurrence among the upper classes than is generally supposed; and that, if practitioners were to seek rather to combat the tuberculous diathesis than to treat its local manifestation, consumption would come to be looked upon as a curable disease; for, if recoveries have not been so numerous as they might have been, it is because the right means of effecting cures have rarely been adopted. In Great Britain, more especially, as also in the United States, practitioners, unlike those of most European countries, are accustomed to trust almost exclusively to pharmaceutical agents in the treatment of chronic diseases, but seldom endeavouring to rectify the anormal conditions of the system, upon which depend morbid local manifestations, by the employment of hygienic and medical means, which, by effecting favourable modifications in the constitution of patients, tend to procure permanent cures instead of a temporary alleviation of suffering or a transient amelioration of their state. "To occupy one's self in treating merely the manifestations of a diathesis," says a distinguished French physician, "is, generally, as if one were to run after the shadow, and leave the substance which it is desirable to attain;"[1] and the adoption of this mode of

[1] M. Baume's—Traité des Diathèses. Paris, 1853.

treatment in a disease which, like consumption, so directly compromises the lives of the persons affected, is attended with the most pernicious consequences, because the precious time is lost, during which there would be the greatest probability of succeeding, by the employment of climate and other suitable measures, until the disease has arrived at a stage when the use of all remedial means would fail to arrest its progress.

A serious obstacle, however, presents itself to the favourable termination of the disease in many cases where a cure might be effected, viz., the difficulty which often exists in ascertaining the presence of tuberculous matter at its outset. A minute examination of the physical signs supplied by an abnormal state of the respiratory function, would, in many instances, lead to the discovery of tubercles in the lungs before their presence was indicated by clearly marked general symptoms; but the majority of practitioners are scarcely capable of making such an examination as would frequently suffice to detect pulmonary disease in its earliest stage, especially in England, and probably also in America, where exploration of the state of the organs contained in the thoracic cavity, by means of auscultation and percussion, forms no part of the education of medical students.[1] It consequently follows that the weakness, and various other symptoms experienced by patients in the early stage of pulmonary

[1] I understand that in several of the Medical Schools of America, auscultation forms part of the course of study.

tuberculization, are usually regarded as the indications of no very serious malady, or of a temporary indisposition; which opinion is often confirmed for a period, by the amelioration which takes place from time to time in chronic cases, and by the temporary cessation or alleviation of chest symptoms, produced under the influence of favourable circumstances, as the summer season; a residence in the country for some weeks or months; or of the remedies which may have been had recourse to. Hence, patients, their friends, and frequently the medical practitioner, are misled as to the true nature of the disease, until, at the expiration of a longer or shorter period, either spontaneously or from the action of some exciting cause, the symptoms reappear with aggravated intensity, and auscultation, practised by an experienced physician, renders its existence apparent.

Consumptive patients of the United Kingdom of Great Britain and Ireland have sought, more than those of any other nation, the curative influence of climate; and British medical literature contains a vast accumulation of facts relating to the effects of the climates of our colonies, as well as of other places frequented on this account; but, owing to the causes above mentioned, and the late period at which recourse is had to this remedial agent, the results have been very unsatisfactory, and we are still far from being able to estimate justly the amount of advantage which climate is calculated to afford in tuberculous disease, if employed under circumstances

more favourable to its beneficial action than heretofore.

Abernethy, following in the steps of John Hunter, is the first pathologist who imparted a definite direction to the ideas of his countrymen, with respect to the constitutional origin and treatment of local diseases, in his celebrated work which bears this title; and the principles therein promulgated having been put in practice, more especially as respects the treatment of surgical diseases, have powerfully contributed to raise the character of British surgery from a simple art to that of a science, and have rescued innumerable sufferers from local diseases, from painful mutilations, and premature death. But, even at the close of the last century, and several years before the publication of his work, Abernethy, referring particularly to pulmonary consumption, after having shown that the organ may be the seat of *the disease,* although its causes may be at a distance, insists upon the inutility—the organ being secondarily affected—of treating the disease as an integral thing.[1] His opinions on the origin of pulmonary phthisis are corroborated by the investigations of recent observers, and their exactness appears to be confirmed by the results of experience. The researches instituted of late years, in different parts of Europe, respecting the nature of consumption, and the formation of tubercle, having greatly elucidated its pathology, and induced many practitioners to ascribe more importance to hygienic measures, and seek to cor-

[1] Surgical and Physiological Essays, 1799.

rect the morbid disposition by agencies which conduce to effect favourable modifications in the constitutions of patients, rather than to persist in following the system of pharmaceutic and palliative treatment generally adopted in these cases.

The investigations of M. Boudet are especially important, inasmuch as they demonstrate, by means of chemical analysis, that tuberculous matter contains several saline and other principles, which enter into the composition of the blood. According to this observer, "tubercle is not distinguishable from the parenchyma of the lungs by any special product, but merely by some difference in the proportions of the principles of which they are both composed, especially of the chloride of sodium, which abounds in tuberculous matter, of the phosphate of lime, which, on the contrary, is present only in a minute quantity, and of the cholesterine, which is accumulated in it to such an extent that its proportion is ten times as large as in the substance of the lung. Tuberculous matter treated by alcohol yields oleic, margaric, and free lactic acid, lactate of soda, and cholesterine, in the proportion of a 20th part of the whole mass. Chloride of sodium and phosphate of lime are found in the ashes of tubercle, which likewise yield a small quantity of carbonate of lime, sulphate and carbonate of soda, silex, oxide of iron, and lactic acid.[1]

The salts which are found in the largest quantity in the blood, are chloride of sodium, carbonate of soda, and phosphate of lime; and the variation in

[1] Compendium de Médecine, art. cit.

the proportions of these salts, as well as that of the iron contained in the blood, occasioned by various causes, must necessarily exercise a considerable influence in the production, and in the course of several chronic diseases. MM. Becquerel and Rodier remark that the diminution of the chloride of sodium is of constant occurrence under the influence of fasting; its proportion is likewise diminished in acute diseases; the quantity of phosphate in the blood is, on the contrary, increased in most diseases. The proportion of this substance being, in healthy blood, on an average, as 350, increases in cases of pulmonary tuberculization to 403.

The retention in the blood of the water, salts, acids, &c., which should be eliminated by the skin more particularly, by altering the composition of this fluid from its normal condition, gives rise to various chronic diseases, of which the origin is not generally suspected. According to the chemical authorities, whom I have just quoted, in 100 parts of dried sweat, there were found 22 of fixed salts, consisting of carbonate, sulphate, and phosphate of soda and potass, chloride of sodium, phosphate and carbonate of lime, with traces of oxide of iron.[1] M. Favre found ("Archives de Médecine," July 1853) that 14 *litres* (28 pints) of sweat yielded the following principles: 1. Parts soluble in water: Chloride of sodium, 22.305 grains; of potass, 2.437; alkaline sulphates, 0.9150. 2. Alkaline lactates,

[1] Chimie Pathologique. Paris, 1854.

3.171; alkaline sudorates, 14.623; urea, 0.428; fatty matter, 0.13; water, 9,955.

We have seen that some of the products have been found in the analysis of tuberculous matter; that the chloride of sodium, of which the amount in the blood is diminished in diseases of debility, is found to exist in abundance in tubercle, and that, on the other hand, the phosphate of lime, which exists, in a very minute proportion, in tuberculous matter, is found to be greatly increased from its normal proportion in the blood of tuberculous subjects.

It would be out of place to enter, on this occasion, further into details pertaining to the domain of animal chemistry; the few remarks which have been made sufficing to indicate the relation which exists between the morbid deposit, the blood and the cutaneous secretion, the practical bearings of which will become more apparent after we have entered more fully into the subject of the present enquiry.

CHAPTER II.

ON THE NATURE OF PULMONARY TUBERCULIZATION.

Several distinguished pathologists have considered tubercle to be a product of inflammatory action. Foremost among these, in recent times, was Broussais, who said that he had never seen tubercles in the lungs without previously existing inflammation. M. Bouillaud, who, in most instances, adopted the opinion of Broussais, likewise considered that tubercle may arise from inflammation of the organs of respiration. More recently, Dr. Addison, of Guy's Hospital, London, expressed the opinion that scrofula and pulmonary tubercle are frequently occasioned by inflammatory action, and, that a great number of the excavations which have been generally considered as arising from the softening of tubercles, are, in fact, a consequence of pneumonia.[1] Reinhardt, of Berlin, in a late publication, considers tubercle to be a product of chronic inflammation fre-

[1] Guy's Hospital Reports.

quently repeated.[1] Van der Kolk, of Utrecht, expresses an analagous opinion ; which, however, is not adopted by the generality of pathologists and practitioners. Laennec remarked that the development of tubercle is owing to a generally disordered state of the system, which takes place independently of preliminary inflammation, and that where inflammation co-exists with tubercles, it is subsequent to them. Besides, the deposition of tubercles simultaneously in several parts of the body, directly disproves the doctrine of their inflammatory origin. Bayle said that tubercles were never an effect of inflammation, even in the chronic form. Louis believes that although inflammatory action may in some instances exercise an influence over the production of tubercles, yet that in others it seems to take no part in their formation.

Dr. Carswell remarks on this point : " An effect and its cause are always inseparable under conditions of an analagous nature. The products of inflammation are coagulable lymph and pus. When, therefore, other products than these present themselves in inflammation, the conclusion to be drawn from this circumstance is, that there exists some other morbid condition than inflammation, and that, to this condition alone should be ascribed the distinctive and essential character of these products.

" Where the tuberculous disposition exists, inflammation or any irritation may attract it to a particular organ ; examples of this present themselves in the inflammation of the subcutaneous glands of

1 On the Identity of Tuberculous Products with the results of inflammation. (In German.)

the neck ; a testicle, a kidney may become tuberculous from the same cause."[1]

In order to corroborate his observations, Dr. Carswell mentions the case of a young woman who was attacked by pneumonia and bronchitis, owing to the position in which she sat at her work in winter, viz: between a good fire and a door, and which, being continually opened, gave ingress to a current of cold air. The inflammation was restricted to the left side, which was always turned towards the door, and it was found, on *post-mortem* examination, that the lung of this side was in a state of tuberculous infiltration, the bronchial membrane of the same side being more or less inflamed up to the point of bifurcation of the trachea, where all traces of inflammation disappeared. The right lung was healthy, except at the summit of the upper lobe, where there were some tubercles in a crude state, serving to show the existence of tuberculization, preliminary to the occurrence of the inflammation which on the left side had occasioned the disease to assume an acute form, owing to the exciting causes to which the patient was exposed.

Referring to the insufficiency of inflammation to give rise to tubercles in persons not thereto predisposed, M. Andral remarks: "We may readily conceive that a very slight bronchitis may suffice to produce tubercles in one individual, whereas others do not become consumptive notwithstanding the

[1] Cyclopedia of Practical Medicine, art. Tubercle.

prolonged existence of pulmonary catarrh."[1] M. Fournet mentions an instance corroborative of the opinion that irritation existing in an organ attracts to it the tubercular deposit in preference to its ordinary seat. "In several patients," he remarks, "unhealthy or insufficient food was the most decided cause of the tuberculous cachexy; consequently, the intestinal tuberculization was much more advanced in its course than the pulmonary tuberculization; the tubercles were in a crude state, or the softening process had only commenced in the lungs, whereas large and deep tuberculous ulcerations were observed in the small intestine. This fact is explained by the principle, that when from the existence of tuberculous cachexy, tuberculization has become imminent, it will fix itself on the viscera to which it is attracted by any irritation of sufficient degree and duration."[2]

Sir James Clark remarks on this subject, "Although I believe tuberculous matter is never a product of inflammation in a healthy person, the inflammation may and often does act as a determining cause in a tuberculous constitution."

In the case of stone-masons, coal-heavers, flax-dressers, metal-grinders, and needle-pointers, who frequently become consumptive, it is not merely on account of the inhalation of metallic particles, stone, dust, &c., that tuberculization is induced, but as Sir James justly remarks: "The sufferers are exposed

[1] Cours de Pathologie Interne.

[2] Recherches Cliniques sur l'Auscultation, &c., Paris.

to causes fully adequate to the production of tuberculous cachexia; they pass most of their time in a confined, deteriorated atmosphere, often in a sedentary position, unfavourable to the action of the lungs; many of them are much exposed to the vicissitudes of the weather, and the majority of them are addicted to the use of ardent spirits." Dr. Alison states that "there is hardly an instance of a mason employed in hewing stones in the vicinity of Edinburgh, living free from phthisical symptoms to the age of 50. Nevertheless, tubercles were not found in the lungs of those who were examined after death. In some there were condensed or indurated portions of lung; in others, parts of these organs were in a soft pulpy state, with effused serum, pleuritic adhesions, and much effusion into the bronchia. Few of the workmen in the quarries of St. Roch pass the age of 40; the disease is commonly called the '*Maladie de Saint Roch.*' The symptoms are similar in all these cases to tubercular phthisis, and are often, no doubt, connected with it."[1]

We may, then, conclude that inflammation cannot, of itself, give rise to pulmonary phthisis; but that when a predisposition to the disease exists, inflammation, as also irritations of various kinds, when sufficiently powerful and long-continued, may occasion the development of tubercles in any organ which is the seat of them; and further, that it is with reason that pathologists, with some exceptions, have regarded tuberculization as a disease depending

[1] On Consumption.

upon an alteration of the blood from its normal condition.

But, what is the nature of this alteration? This is a point which has not been determined up to the present time. Several years ago, MM. Andral and Gavarret showed that even at the outset of the disease there was a considerable diminution of the normal amount of globules, with an excess of fibrin in the more advanced stages. "The patients in whose lungs tuberculization is beginning," say these authors, "present the particular modification in the composition of their blood which belongs to weak constitutions; they are truly in a state of incipient anæmia, and their blood resembles that of persons who have been repeatedly bled. Thus, the condition of the blood which coincides with the beginning of consumption, and which most likely precedes it, is the same general condition which we find in all cases where, from whatever cause, the vital powers have lost their energy.

"Is it, however, to be inferred from this, that the impoverishment of the blood in globules is sufficient to produce phthisis? By no means; but it is to us a certain sign that this disease originates in a notable weakening of the constitution, and joined to those signs derived from clinical observation, this sign comes to enlighten us in the choice and direction of therapeutical means."[1]

That the morbid state of the blood which gives rise to tuberculous cachexy, may exist for a long

[1] Hématologie Pathologique.

period before the formation of tubercle in the lungs, has been demonstrated by Sir James Clark, Mr. Ancell, and other pathologists, and there can scarcely be a doubt that the more immediate cause of vitiated states of the blood, is in most instances to be ascribed to a diminution or suppression of the insensible perspiration from inactivity of the capillary circulation of the skin, by which the substances contained, as we have seen, in this secretion, are retained, instead of being eliminated from the system. "We have found," remarks a distinguished medical author, "in the changes which the blood may undergo in its composition, a fruitful source of alterations in the mode of its vitality. It would seem that it is only through this medium that we can act upon the nervous system to modify its action so as to change the constitution of individuals, on account of the extent to which this fluid may vary, and the apparent immutability of the nervous system in its form and structure."[1]

The authors of a recent work, nevertheless, express the opinion that in the immense majority of cases, tuberculization remains a local lesion, the deterioration of the constitution being owing to the suppuration and to the gradual extension of the disease. "At the beginning of pulmonary phthisis, they observe, if there exist no complication, the composition of the blood preserves its normal characters. As, however, the disease advances, the tubercles become softened, and complications arise,

[1] Dr. Edwards on the Influence of Physical Agents on Life.

(bronchitis pleurisy, &c.) the blood then presents the same alterations as in serious diseases, and especially in inflammations The diminution of its globules is, however, more rapid, and is carried to a greater extent in cases of phthisis."[1]

The opinion of these celebrated chemists that the deterioration of the constitution, and the alleviation of the blood are the effects and not the causes of the local affection, is refuted not only by the investigations of pathologists, but likewise by the most ordinary experience, which shews in the very appearance of the patients, frequently before any symptoms have indicated the existence of a local lesion, that their blood is very far from possessing a healthy character, and I would not have quoted it were I not apprehensive that some practitioners might be misled by the reputation of these authors.[2]

We have already noticed the constituent parts of the perspiration, and it may readily be conceived that any notable diminution of this secretion, arising from defective action of the skin, must exert a great influence in the production and maintenance of

[1] Becquerel et Rodier—Chimie Pathologique.

[2] Dr. Radclyffe Hall, of Torquay, in an elaborate paper on Tubercle, in the British and Foreign Medical Review, remarks: "The deposition of tubercle is progressive. What causes this progressiveness? In the first place, and mainly, the persistence and increase of the cachexy. Then inflammation around existing tubercles, provided the cachexy is great. The tubercle already deposited has not, from the mere fact of its presence—at all events, before the period of softening—any direct influence in keeping up the tuberculous diathesis."

cachectic states of the system, and we may reasonably conclude that the most likely means of curing diseases, which result from the consequent deteriorated condition of the blood, would be by restoring the equilibrium of the deranged functions, exciting through constitutional agencies those of the skin, with a view to restore to the blood its normal properties before the diseases thence resulting have become irremediable.

"The regulation of the temperature of the body," says a recent writer, "is only one of the purposes fulfilled by the perspiration. Another and an important one, is the removal from the system of a number of compounds, noxious to animal life. It was estimated by Lavoisier and Seguin, that eight grains of perspiration were exhaled from the skin in the course of a minute, a quantity which is equivalent to 33 ounces in 24 hours; of this quantity a large proportion is naturally water, but nearly one per cent, according to Anselmino, consists of solid substance. Of the latter, 100 parts contain about 23 parts of salts, the remainder being organic matter. An analysis of 100 parts of the solid matter of perspiration, according to Anselmino, gave the following results: Osmazone combined with common salts, 48 parts; lactic acid salts with osmazone 29 parts; animal matter with vitriolic salts 21; calcareous salts 2; to which may be added carbonic acid gas, ammonia and iron.

The number of square inches on the surface of a man of average height and bulk is 2500; the

number of pores 7,000,000; 145,833 feet, 48,000 yards, or nearly 28 miles of perspiratory tube. What if this drainage were obstructed?"[1]

It is not, however, solely by means of the arrest or defective elimination of excrementitial matters from the blood, that inactivity of the functions of the skin may tend to produce tubercular cachexy. The close relationship which exists between the skin and the organs of respiration, and the part which it takes in the excretion of carbonic acid from the economy—and probably in the absorption of oxygen from the atmosphere—must lead us to consider it as a truly supplementary apparatus for the efficient accomplishment of this function, and that any material derangement of the skin must exercise a most pernicious influence on the organs contained within the thoracic cavity in many cases, even though the effects of this influence may not be immediately apparent.

At the close of the last century, the respiratory action of the skin had already been noted by Messrs. Ingenhouze and Cruikshank; and the experiments made by Abernethy clearly showed that carbonic acid was excreted, and the oxygen of the atmosphere absorbed in variable proportions by this membrane. After keeping his hand alternately in two inverted vases containing respectively twenty-four ounces of oxygen and of azote, for a period of eight hours, Abernethy found that two thirds of the oxygen had

[1] Influence of Tropical Climates on European Constitutions, by Ronald Martin. 1856.

disappeared, whereas only a twentieth part of the azote had been absorbed. "After the hand," he says, "had continued nine hours (in the air of an inverted jar) more than an ounce of carbonic acid gas had been produced, and the remaining air contained one-fourth less of oxygen than before the experiment." Estimating the extent of the surface of the body at 2700 square inches, he remarks that, the increase of the action of the lungs consequent upon the repression of that of the surface of the body, must necessarily often produce diseases of these organs, especially in individuals whose thorax is but imperfectly developed. "If the perspiration of all parts were equal, 77 drachm measures of carbonic acid, and one-third of that quantity of nitrogenous gas, would be emitted from the body in the space of one hour. If we also suppose perspiration to be at all times equal, nearly three gallons of air would be thrown out of the body in the course of one day. About 2½ pounds is the loss of water which the body sustains in one day; the absorption of air was equal to the perspiration in my experiments, in many it was more, if the air was salubrious to which the skin was exposed."

"I am inclined on reflection," he adds, "to believe that a deficient performance of the functions of the skin is the principal cause of pulmonary consumption. This supposition explains why the inhabitants of this variable climate, especially those of weakly constitutions and malformed chests, are so peculiarly obnoxious to such complaints. This

supposition also shows in what manner the preventing the effects of accidental colds by flannel garments, or by removal to a warmer climate, is so eminently beneficial. The fluids are invited by warmth to the surface, and the functions of the skin are encouraged; the lungs are relieved from oppression, and left free to the exertion of the restorative powers of the constitution."[1]

MM. Becquerel and Rodier demonstrated by experiment that an impenetrable coating of varnish applied to the bodies of dogs occasioned a rapid depression of temperature, followed by death in the course of a few hours; and an author, who of late years, has endeavoured to show the effects of suppressing the functions of the skin in inducing pulmonary consumption, after having made many experiments, remarks on this subject: "Apply a coating of tar or any impermeable substance either to the whole body, or to larger or smaller portions of it. The consequences will be manifested more or less rapidly and seriously according as the coating has been more or less complete. In all cases the health of the animal becomes strangely disordered, and life is seriously compromised. Some have died at the expiration of one, two, or three days; some even after a few hours. Death appears to be the result of a positive asphyxia; the breathing of the animals become very difficult; they make deep inspirations in order to inhale a greater quantity of air than in their natural state; they die violently.

[1] Surgical and Physiological Essays.

On opening the bodies, there is found in the veins and in the right cavities of the heart, less frequently in the left cavities, and but seldom in the arteries, a black blood forming at times soft diffluent clots, coagulating with difficulty on exposure to the air. This dissolution of the blood favours ecchymoses and extravasations in the lungs and other organs; the capillary vessels are generally injected; it is evident that the alteration of the blood has been the true cause of the stoppage of the circulation in this order of vessels.

"On examining the products of transpiration during hard work or exercise, we may infer what consequences would result from a state of habitual repose of the animal economy. During violent exercise, the sweat moistens the skin, vapour is condensed in considerable quantity on the inside of waterproof garments, and the lactic acid reddens those articles of apparel of a blue vegetable dye with which it may come in contact. Every one knows how frequently linen requires to be changed, and how necessary it is to wash and bathe oneself frequently, when the work or exercise are hard and prolonged. During repose the same elements remain in excess in the economy. Men and animals become fat, the water tends to extravasate itself into the textures; the salts tend to form other than normal combinations; and the excess of lactic acid becomes the occasion of many diseases, of which the form and nature vary according to circumstances of age, climate and locality.

"The treatment of phthisis finishes where it ought to begin. The air of the country is recommended to moribund persons; phthisical patients are sent into Italy or the south of France, when all hope is lost. In this treatment all is inverted. The remedial means are directed towards the lungs instead of being directed to excite and restore the functions of the skin."[1]

The preceding observations may suffice to confirm the opinion that pulmonary consumption arises from a vitiated state of the blood, principally caused by suppressed or diminished eliminatory action of the skin, (and, perhaps, partly from the deficiency of absorption of oxygen from the atmosphere), and a consequent diminution in the amount of red globules, and, therefore, that it should not be considered as a merely local disease, but requires to be treated chiefly with reference to the disordered condition of the blood, before it has arrived at so advanced a stage as to preclude all rational hope of recovery.[2]

[1] Dr. Fourcault—Causes Générales des Maladies Chroniques. Paris, 1844.

[2] In the rare and exceptional cases of tubercle being found in the lungs of children who have died soon after birth, disease, or a diseased condition of the blood, had already existed to a high degree in the parents, the tuberculous matter which would have been deposited in their lungs, being transferred to those of their offspring.

CHAPTER III.

ON THE RELATIVE FREQUENCY OF PULMONARY PHTHISIS IN DIFFERENT COUNTRIES AND PLACES.

Pulmonary consumption, though extensively prevailing in most parts of the world, is yet of much more frequent occurrence in some countries than others. It is more so in temperate than in either very cold or very hot latitudes, especially where a cold and humid state of the atmosphere exists in winter, spring and autumn, as in Great Britain and Ireland, a great part of France and Germany and in Holland. It is, however, of frequent occurrence in hot countries where the air is at the same time moist, owing to the debilitating and relaxing effects of the climate, as in the West Indian Islands, particularly in the natives who have been exposed all their lives to its influence. The proportion of deaths from this cause among the soldiers (whites) there stationed, amount to nearly as many as in Lon-

don, whereas, among the natives, it is twice as large. The statistical statements of the frequency of phthisis in those parts is confirmed by M. Levacher in his "Guide Médical aux Antilles," and a French writer in the "Gazette Médicale" states that at Rio de Janeiro, the number of consumptive patients in the hospital is nearly as great as in Paris. The professor of medicine in that city considered that a sixth of the mortality among the poorer clasaes of the Brazils was owing to this cause.

On the other hand, the disease is infrequent in countries where the winter climate is cold and dry, as in Sweden, part of Norway, great part of Russia and Canada. Neither are the inhabitants of these countries so liable to scrofulous affections as those of cold and moist, or warm and moist countries. Mr. Philips remarks, in his work on Scrofula, the inhabitants of cold countries are not liable to be affected by the external forms of tuberculous disease. They, as well as phthisis, are very rarely seen in Iceland, in Greenland, or at Spitzbergen. Colonel Tulloch, in his report to the War Office, shows that the soldiers sent to cold and dry countries, are less frequently affected by scrofula and phthisis than those stationed in hot countries. Nova Scotia and New Brunswick, while the winter temperature is very low, the disease is less frequent than in Jamaica and at Sierra Leone.

Dr. Forres in his statistical researches in the medical department of the American army, remarks that in the whole southern region of the United

States, the proportion of soldiers annually attacked by consumption amounts to 10 per 1000, the total amount of deaths from consumption and hemoptysis being 108; whereas, in the northern region, the annual proportion of consumptive soldiers is only 7 per 1000, that of the deaths being 47, and that, moreover, in that part of the northern region where the climate is most severe, the proportion of phthisical patients is not more than 5 per 1000.

M. Andral remarks on this subject, "Pulmonary phthisis has been observed in all countries, but not in all with the same degree of frequency. From the 60th degree of north latitude to the 30th it is tolerably rare. At Vienna, on 1000 deaths from various causes, 114 are considered to be owing to phthisis, at Munich 107, at Berlin 71, at London 236, at Paris a fifth of the whole number of deaths. From the 45th to the 35th degree, this disease carries off, at Marseilles, a fourth part of the sick, at Philadelphia an eighth, at Nice a seventh, at Genoa a sixth, at Naples an eighth. It commits great ravages on all the shores of the Mediterranean.

"On approaching the equator, between the 20th and the 10th degrees, it is common in the West Indies (Antilles) affecting principally the negroes. It is of frequent occurrence at Madrid, at Gibraltar, at Lisbon, but it is a remarkable circumstance that it is scarcely known on the African shore.

"It is very fatal at Malta and in the Mediterranean Archipelago. When the English ships are stationed in these districts, many persons, with delicate chests,

soon succumb to phthisis. It is also very fatal in the Indian Archipelago, in the islands Mauritius, Bourbon, and in the East Indies. It is incontestable that cold and dry, or warm and dry climates are also subjected to this fatal influence; witness the frequency of tubercles at Naples and Marseilles. The minimum of frequency is found to be in climates having a mild temperature.

"M. Benoiston de Chateauneuf has specified a curious result respecting the deaths of soldiers taken from the northern, the southern, and the central divisions of France. In the space of six years, out of 3742 deaths of soldiers born in the northern division, 296 were from consumption; in those of the central division the proportion in 7665 was 426 from phthisis; in those of the southern division 361 in 4375, whence it would appear that the maximum of frequency of tuberculous disease is found in the south of France. Tubercles are very readily developed in individuals passing from warm and dry, to cold and humid countries. The island of Ceylon has, relatively to the interior of Africa, a cold and moist climate, and the negroes transported there, are decimated by tuberculous disease. Mr. Broussais verified the fact, that the same French regiments lost a much larger number of men in Holland than in Spain. Doctor Clot Bey remarked that tubercles, which are very rare among the inhabitants of Egypt, are not unfrequently developed in the negroes of Senaar, who are transported from the scorching Nubia, to the milder temperature of

northern Egypt.[1] Almost all the animals which are brought from tropical countries into Europe, and are shut up in menageries, die from pulmonary tuberculization."[2]

Some of these observations of M. Andral, with respect to the frequency of the disease in certain localities, are disproved by more recent experience, as are also some of M. Lebert's, who considers that there exist but slight variations in this respect, between different parts. After adverting to the statistical tables compiled by order of the British Government, and quoting the erroneous opinion of M. Louis, that tubercles are as frequent in the central parts of Italy as in France, this author proceeds to say: "In fact, in all these possessions, diseases of the chest are very common, though varying in a slight degree. If they are common in Canada and Nova Scotia, they are likewise common on the Mediterranean, at Gibraltar, at Malta, in the Ionian Islands; in the West Indies, the Bermuda Isles, and Jamaica, the temperature of which places present so many variations. Thus of 61,066 soldiers stationed in Canada during twenty years, there were 402 consumptive, or 6.5 per 1000 annually. The proportion was the same for Gibraltar; and of 11,720 stationed in the Bermuda Isles for 20 years,

[1] This circumstance is referred, by a recent writer, partly to the state of slavery and privation of the negroes (Rhind on Egypt). The valley of the Nile is likewise relatively humid as compared with Nubia.

[2] Cours de Pathologie.

103 were affected with the disease, or 8.8 per 1000, and yet the climate of Bermuda is mild and *equable*, whereas that of Canada is extremely cold, and exposed to great and sudden variations of temperature.[1]

"The differences with respect to the frequency of tuberculous and scrofulous affections, as regards climate," adds M. Lebert, "are inconsiderable, and those which have been signalized as very great are not based on documentary evidence. We are, therefore, very much disposed to believe that scrofula and tubercle prevail, in a certain proportion, throughout the whole human race in general, but that this proportion may vary *slightly* in different countries. The influence of profession on the production of tubercle is not proved by any authentic documents.

"Climate, in general, does not seem to exert a very great influence on the production of tubercle and scrofula. As regards tubercles, their common existence, and the great ravages which they occasion, have been verified in almost all places whence tolerably correct statistical accounts have been obtained."[2]

These opinions are opposed to the observations derived from ordinary experience. With respect to the production and course of these affections, every practitioner of any standing in the profession can-

[1] It has been proved that phthisis is less frequent even among the troops in Canada than in England, and that consumptive soldiers sent there from the West Indies often recover.

[2] Traité des Maladies Tuberculeuses.

not have failed to notice the beneficial effects produced by favourable weather, and the more or less decided amelioration which ensues in patients during the early stages of phthisis, as well as in those affected with scrofula, during the summer season; as well as the aggravation of the symptoms of these diseases in the cold, rainy, and damp weather which prevails in the same countries at other seasons.

M. Fournet, referring, in his work on "Phthisis," to the good effects of favourable weather even on hospital patients, remarks: "In order to assure myself of the reality of the suspension of the disease, I sometimes kept some of our patients for a long time (in the hospital), and during this period of calm and repose, aided by good food, walking in the courts and gardens, and a sufficient amount of sleep, their health improved daily. Many of them, however, especially in winter, seemed in a short time to be arrested in their convalescence, and to feel the bad effects of the in-door life to which they were condemned, and of the impure air which they breathed. In some of them, these bad effects were experienced within a few days of their admission. If, on leaving the hospital, they went to rest for a few days in the country, their health and strength became almost completely restored; but then, thinking themselves cured, they returned to Paris, resumed their work, and at the expiration of a longer or shorter period again applied to be

received into the hospital, the disease having made progress."

It is because the statistical accounts of the mortality occasioned by phthisis have been chiefly derived from hospitals and other charitable institutions, and from the reports of the health of troops stationed throughout the year in countries where the climate at certain seasons is extremely unhealthy, and not from the general population returns, that these and some other distinguished physicians have entertained the opinion that there exist but slight differences with respect to frequency of the disease in different countries. It is true, that in some localities favoured by climate—especially on the shores of the Mediterranean and in Italy—phthisical affections are tolerably frequent; but from what I have been able to perceive during the periods of my sojourn in some of these places, as well as from the information which I have obtained on the subject from resident practitioners, I can affirm that these affections are frequently not tuberculous—at all events, not till towards the close; that they mostly prevail among the lower classes of the population—the upper classes being comparatively exempt; and are attributable more to the anti-hygienic conditions under which these classes live—being exposed equally to the summer's relaxing heat, and the variations of temperature at other seasons—than to the climate. This opinion is corroborated by the fact, that the inhabitants of

the country in the neighbourhood of three towns, though liable to bronchitis, rarely become affected with pulmonary tuberculization.

In addition to the debilitating causes which deteriorate the health of the inferior classes in the towns of Italy, and on the shores of the Mediterranean, another may be specified, which not unfrequently tends to induce consumptive diseases. Pneumonia and bronchitis are of common occurrence in these countries, owing to the vicissitudes of temperature, and deficiency of suitable clothing of many of the lower class of the population, and they are usually treated by the repeated abstraction of small quantities of blood, which, without effectually arresting the progress of the inflammatory action, greatly weakens the patients, and protracts the convalescence of those who do not succumb, rendering them the more liable to a recurrence of the disease on being again exposed to its exciting causes.

I find these opinions, which I have long entertained, corroborated by the following observations of Dr. Parola: "In warm, dry, and well-ventilated countries, as the shores of the Mediterranean, great part of Italy, and the south of France, scrofula and tuberculous diseases are rarely met with in the country localities, especially where the inhabitants occupied in agricultural pursuits live in good houses, and are supplied with food suitable to their condition. In country places in Holland, on the contrary, especially in the north, as well as in those in England,

and on the northern banks of the Rhine, these diseases are more or less predominant, and are even more frequent than in the towns. I have remarked that, on the other hand, these affections are much more common in the towns along the Mediterranean coast than in the country. From these observations it may be inferred, that the cause of these differences—viz., the greater prevalence of scrofula and tubercle in some of the chief cities of Italy than in the neighbouring country districts—is not attributable to the climate, as it is in England and Holland, since they would then be more prevalent than in the country. We should rather ascribe it to the sedentary habits, the unhealthy disposition of the houses, and to other anti-hygienic circumstances, which causes are more frequent in towns. Who, in fact, is unacquainted with the narrowness of the streets, the height of the houses, in Nice, Genoa, and Naples, where the inhabitants of the lower classes are compelled to live in passages, cellars, or ground-floors deficient in light and ventilation. It may thus readily be conceived that in these towns, this class of inhabitants, closely packed together, suffer from the deficiency of the primary elements of life (good air and light), and from breathing a more impure atmosphere than the fogs of England and Holland. If, moreover, we contrast the dirtiness of the habitations and of the streets—of Naples, for instance—with the proverbial cleanliness of Holland and England, which partly counteracts the inconveniences of their cli-

mates, we need experience no difficulty in detecting the source of tuberculous diseases in our cities, though their prevalence is less than in the north-west of Europe." [1]

Dr. Parola further remarks, in another part of his work: "On comparing the statistics of the hospitals of the principal towns of Italy with those of northern France, England, and Holland, we may convince ourselves that the number of consumptive patients is comparatively small in our country. Professor De Renzi, of Naples, states, that in that city, the mortality from phthisis in the hospitals is in the proportion of 1 to 12, whereas in those of Paris it is as 1 to 4."

M. Andral states, as we have seen, the proportion of deaths from phthisis at Naples to be as 1 to 8, which must be considerably exaggerated. He likewise speaks of the exemption from phthisis of the natives of the African shore of the Mediterranean. This shore is, however, warmer and drier than the European shore; it is also less exposed to the action of winds and of sudden changes of temperature; but this comparative exemption, which M. Andral considers so remarkable, is, in great measure, owing to the differences in the mode of life of Africans from that of the poorer classes in southern Europe, and also to the absence of the anti-hygienic causes already specified, which in Europe so greatly tend to induce the disease. The Africans have few

[1] Della Tuberculose, 1850. (The work to which the prize of the Medical Academy of Turin was awarded.)

artificial wants, and a little labour suffices to procure for them the means of subsistence. They live in habitations but one story high, and well ventilated. These circumstances sufficiently explain the exemption from tuberculous diseases which they enjoy. The inhabitants of the Spanish shore of the Mediterranean, from Barcelona to Cadiz, are likewise in a great degree exempt from pulmonary consumption, though it is sometimes met with in hospitals and among the lower classes, as a consequence of neglected or badly treated inflammations and catarrhal affections; for, notwithstanding that in this part of Europe the climate in winter is so mild and equable that fires are not used for warming the apartments, acute and chronic inflammation of the respiratory organs are pretty frequent among the inhabitants, who are not sufficiently careful to guard against the difference of temperature which is experienced between the middle of the day, when the sun is powerful, and the mornings and evenings; and when these affections are neglected, or recur, they not unfrequently terminate in pulmonary phthisis. The extreme heat of the summers, likewise, greatly predisposes to catarrhal affections by relaxing the system, and especially the skin, which becomes incapable of reacting against the accidental impression of a cold air. When at Valentia, I was told by Dr. Battlés, the chief physician of the hospital, that there had been a perceptible increase in cases of phthisis since the formation of a new public garden, which is much

frequented on summer nights, and where many of the inhabitants remain till a late hour, sitting on the stone benches. From the information which I procured in other towns on this coast, I convinced myself that the prevalence of diseases of the air-passages and pulmonary phthisis were mainly owing to analogous causes.

Although the statistical accounts, furnished by the military surgeons attached to the regiments stationed in some of the English colonies, exhibit a tolerably large mortality from consumption, yet it would be wrong to ascribe this mortality almost exclusively to the climate—as has been done. It should rather be referred, in great measure, to the mode of life led by soldiers; for, in these same stations, the officers, whose mode of life does not materially differ from that of civilians, are not attacked by the disease; neither are the natives, unless exposed to the action of the accidental causes already mentioned.

Dr. Fourcault remarks, that the military life predisposes to phthisis—the soldiers, clothed in uniforms which impede free muscular action, being subjected to formal exercises, which are but little favourable to health; and when to this cause is added the barrack life, the vitiated air of the dormitories, and the excesses frequently committed by soldiers, we shall have no difficulty in accounting for the frequency of consumptive diseases among them, especially in certain localities where they are exposed to the enervating influence of a warm cli-

mate during the summer season. Dr. Davy states in his work on "Malta and the Ionian Islands," (London, 1842), that, although the soldiers are there liable to tuberculous diseases, the indigenous and British population is exempt from it. He ascribes this prevalence of the disease among the soldiers to the irregularities of their mode of life, together with the frequent variations of temperature to which they are exposed while performing their exercises and on sentinel duty, the crowded state of the barracks and *corps de garde,* which are hot and badly ventilated. At Gibraltar, pulmonary phthisis is infrequent among the mixed population, notwithstanding the exposed position of this peninsula to the east wind, which has become humid from its passage across the Mediterranean, and to the continual current which is formed by its blowing through the Straits towards the Atlantic.[1]

[1] The writer of a critical notice in the "Revue des Deux Mondes," (December, 1854), on a recent work ("The Mediterranean, its Physical Geography," &c.), remarks, with respect to the winds of the Mediterranean: "According to the general constitution of Southern Europe, it would seem that the west wind ought to predominate in the Mediterranean, but the great heat from the deserts of Africa, Egypt, Arabia, and Persia, causes in the atmosphere of these regions an ascending current, which is replaced by the colder strata of air derived from Southern Europe. Hence there is a constant passage of masses of European air towards the south, across the Mediterranean. Before the period of steam navigation, it was very difficult for vessels leaving the coasts of Morocco and Algeria to return to Europe. The passage from Marseilles to Alexandria was seven or eight times more easily performed than the return to France."

The author of a recent work mentions a special cause of the frequency of phthisis among the soldiers at Gibraltar. "An officer of high rank," he says, "explained to me the reason of the great mortality arising from pulmonary diseases. The soldiers, after having been drinking and amusing themselves in the town, which is warm and sheltered, hasten, when the retreat is beat in the evening, to regain their barracks, which are situate on the highest and most exposed parts of the rocks. They arrive in a state of perspiration, rest, and undress themselves in a much colder atmosphere than that which they had just left. The particular mode of life of the soldier is, compared with that of the civilian, but little favourable to the enjoyment of an exemption from diseases of the chest, induced by a residence in a hot climate." [1]

The influence of an unfavourable climate is, however, manifested in a striking manner in increasing the mortality from consumption among soldiers, which is always much larger in countries where the disease is prevalent among the inhabi tants (as, indeed, might be expected); and we cannot justly infer—as M. Benoiston de Chateauneuf has done—that because the mortality produced by this disease in the army was greater among the soldiers born in the south of France, than among those born in the central and northern parts, that consumption is more common in the south; for it is more reasonable to believe that the men born in

[1] Dr. Francis—On Change of Climate. 1853.

the northern and central districts were less affected by it because they possessed more robust constitutions than the natives of the south, and were, consequently, better able to resist the action of the atmospheric influences to which they had been all their lives accustomed, as well as to support better the privations and fatigues of military life. It is well known that individuals, born in warm countries, who are transported to cold ones (especially to cold and moist ones), soon become liable to the formation of tubercle, which circumstance depends, I believe, principally upon the diminished activity of the functions of the skin. Hence the black races, in whom the exhalent functions are much more active than in the whites, supply a much larger number of victims to this disease under similar circumstances. "When negroes are brought to Europe," says Sir James Clark, "the diathesis speedily manifests itself in the characteristic form of crude tubercles, not only in the lungs, but simultaneously in many other organs of the body;" and if, as was observed by M. Broussais, the mortality from phthisis was much larger among the French regiments in Holland than among those serving in Spain and Italy, it was because, in Holland—where the climate is cold and damp—consumption is much more common than in the last-named countries, which have climates of a totally opposite character.

Heat combined with humidity, from its weakening effect on the constitution, is likewise very de-

structive. The mortality from phthisis, though tolerably large among the British troops in the West Indies, is, however, smaller than among the natives. The following Table from Dr. Marshall's "Medical Topography of Ceylon," shows that phthisis is not merely relatively, but absolutely more frequent among the natives than among the European inhabitants of that island.

	Europeans.	Malays.	Caffres.	Indians.
Deaths per 1,000 individuals yearly. . .	14.20	36.0	49.0	45.0
Deaths from phthisis per 1,000 individuals	0.6	2.0	7.6	2.6
Proportion of deaths from phthisis per 1,000 deaths . . .	2.3	58.0	146.0	59.0

The influence exerted by various causes in the production of tuberculous disease will, however, be more fully considered in the next Chapter.

CHAPTER IV.

CAUSES OF TUBERCULOUS DISEASE.

We have seen, in the preceding Chapter, that pulmonary consumption is much more prevalent among the populations of those places in which a humid state of the atmosphere—especially when combined with cold—predominates, than in drier localities, from which we may infer how great is the influence of humidity in the production of tubercle. Some additional remarks, respecting this principal predisposing cause, and its mode of action, may perhaps conduce to elucidate the principles of treatment which appear to promise the greatest likelihood of a more successful result than has heretofore been obtained, and may serve to determine the choice of the practitioner as to the climates most appropriate to particular cases.

M. Edwards, in his work already quoted, records the results of a series of experiments which he

instituted in order to determine upon animals the relative effects of air in different states of humidity and dryness, of repose and agitation. These results are highly important in a practical point of view, with reference to the subject of our present inquiry, from the proof which they afford of the great influence exercised by the skin—considered as a supplementary organ to the lungs in the act of breathing,—as well as the part which should be ascribed, from their showing, to the diminished activity of its functions of elimination in the production of various diseases of the respiratory apparatus, especially of pulmonary consumption.

"An air saturated with humidity," says this *savant*, "does not altogether prevent transpiration, but it reduces it to a minimum.

"Within the same space of time (other circumstances being the same, except the hygrometric state), transpiration in a dry air was five or six times as great as in one of extreme humidity. A dry air causes sweat to disappear by its property of absorbing humidity, a moist air by the opposite property allows it to accumulate on the surface of the body. In the former instance, it might be supposed that the dry air lessened the amount of perspiration; in the latter, that the moist air increased it.

"The constant evaporation which takes place around the bodies of animals in an air which is not saturated with water, constitutes for them a peculiar atmosphere which is more humid than the rest

of the air. Now, the currents renew the air which immediately surround the body, and replace it by a drier air. Thus the contact of an air, relatively dry, will increase transpiration, which will diminish, on the contrary, in a calm air, because the circumambient strata being more slowly renewed, will be more impregnated with humidity.

"In a healthy man, and in the ordinary state of insensible transpiration, a moderate degree of dryness of the air may cause an increase in the amount of this secretion, six or seven times greater than in a state of extreme humidity—it may even exceed this quantity. In an atmosphere saturated with humidity, the temperature of which is equal to that of the body, or above it, there would be no aqueous exhalation from the lungs, because there would be no evaporation, whilst the cutaneous transpiration would take place, not by evaporation, but by transudation.

"Even when the atmosphere appears to us to be quite calm, it is in reality tolerably agitated, and acts sensibly upon evaporation by its motion. The differences of transpiration were very marked, even in an atmosphere which appeared calm. The animals (frogs), which were exposed at an open window, lost, at least, double the amount by transpiration, and according to the intensity of the wind three and even four times the amount lost by those which were retained in the interior of the apartment.

"A slight agitation of the atmosphere, the hygrometrical state and temperature of which are

suited to the economy, occasions such a feeling of well-being that the chest dilates in consequence, and admits a larger proportion of air. I have frequently had occasion to convince myself, that persons, who have what is termed a delicate chest, owe in great measure the difficulty and oppression which they experience, to the smallness of their apartment; the difficulty of breathing diminishes or entirely disappears according as they are in a larger apartment, or in freer air. The degree in which the air is agitated exerts the most decided influence on the extent to which the chest dilates; the agreeable sensation which is experienced on breathing in the country is chiefly owing to this cause."

I have often observed, on consumptive patients, the beneficial effects of an air moderately agitated, as well as the disadvantages of too calm an atmosphere. As respects, however, the question immediately under consideration, viz., the action of humidity in inducing tuberculous disease of the lungs, I will adduce a few additional observations from an author whom I have already quoted, who visited several localities situated under different circumstances of humidity and dryness of the air, with a view to ascertain the degree of intensity with which this cause acts, as well as the conservative influence of exercise, or of occupation out of doors, in neutralizing its pernicious effects upon individuals who lead a sedentary life; in whom, consequently, the functions of the skin are inactive.

"It may readily be conceived," remarks Dr.

Fourcault, "that vicissitudes of temperature will exert their chief influence on the cutaneous surface. Atmospheric perturbations produce but a slight effect on the organs contained in the thoracic cavity, the air penetrates into them only in small quantity through an apparatus of ventilation, being warmed in its passage along the bronchial tubes; the skin, on the other hand, being deprived of any similar apparatus, is liable at each moment to experience the action of atmospheric currents of a variable temperature, which naturally derange its functions. These circumstances have been verified by experimental physiology.

"The experiments of Edwards have been repeated with analogous results upon warm-blooded animals; a calm air saturated with humidity likewise reduces in them transpiration to its minimum. Thus the transpiration of men living in damp valleys is reduced to its minimum; on the other hand, the skin is powerfully excited by the air of mountains, of elevated plains, and of the sea; the ventilation there carries off a considerable quantity of the elements of transpiration.

"The village of Fontinay is composed of several hamlets; in the most elevated one, which is exposed to the south, there are but few consumptive or scrofulous subjects; but those which stand on a lower level—one of them being on an acclivity looking to the north, the other between two hills—are very damp and unhealthy. It is especially in these hamlets that scrofula, white swelling, con-

sumptive and other chronic diseases, are multiplied.

"In the same valley, the inhabitants of the more elevated parts are often exposed to acute inflammatory disorders, while chronic diseases are very common in the lower parts; especially where the streets of the villages are narrow, where the water stagnates in them, and the houses are lofty and badly constructed. Individuals who live in cellars die in great numbers of scrofula or consumption.

"Two general causes predominating over all others —deficiency of muscular exercise and humidity, give rise to most chronic disorders. These causes act principally upon the skin; they tend incessantly to repel within the torrent of the circulation superfluous or excrementitious elements which should be eliminated from the economy; they thus produce alterations of the blood and cachectic states of the system, of which the origin is unknown."

A writer in the "London Medical Gazette," (vol. xxx.), remarks, with reference to the influence of a moist atmosphere on the production of tuberculous diseases: "Supposing a climate having a mean temperature of 100° Fahr., saturated with humidity, and the blood circulating through the lungs at 100°, there would then be a complete arrest of the evaporation from the lungs: this suppression is one of the causes which tends to produce phthisis. In tropical countries, where the temperature is very high, and the atmosphere almost saturated with humidity, the disease is very

frequent. On the other hand, where the climate is dry it is infrequent. In Egypt, the atmosphere is hot, extremely dry, and tolerably equable. In Australia, the atmosphere is temperate and variable, but very dry. At the Cape of Good Hope, especially in the eastern department, the temperature is high, very variable, but very dry. In all these countries consumption is rare. In the West Indies, the temperature is high, but little liable to variation, and the air is moist. At Bermuda the temperature is moderate and very variable; the air is very dense, but it is subject to considerable variations, and the amount of aqueous vapours disseminated through it is great. In these countries, phthisis is very common."

Rainy weather and a humid condition of the atmosphere act also indirectly upon the economy in an unfavourable manner, by keeping persons within doors and by preventing exercise in the open air, which, from its promoting the action of the lungs and the capillary circulation of the surface of the body, is perhaps the most effectual means of combating the predisposition to tubercular cachexy, and of remedying it when already existing. The comparative exemption from consumption which the inhabitants of cold and dry countries enjoy, is attributable, in some measure, to their greater activity, in order to guard themselves against the effects of cold. Dr. Foissac, in his recent work on "Meteorology," quotes the remark of Admiral Wrangel, that "Diseases are of rare occurrence in

Siberia, and old people preserve their vigour until a very advanced period. The exercise which they take in the open air, whether travelling on sledges or skating over the ice, is the chief cause of their good health."

M. Andral, after adverting to the fact that tubercular disease is very prevalent among animals, makes an exception in favour of the dog, suggesting, with much reason, that this exemption is probably owing to the habitual activity of this animal. In fact, tubercular disease not unfrequently occurs in dogs chained up, or confined in dark and damp places, and badly fed. M. Fourcault mentions the instance where the dog of a physician, which was accustomed to accompany him in his rounds, on being chained up, when his master entered the military service, died from tubercular disease, exclusively affecting the lungs, mesentery, and subcutaneous cellular texture.

This author has well shown, by conclusive facts, the conservative influence of exercise in the open air, even in counteracting the prejudicial effects of humidity, as also the pernicious consequences of seclusion and of sedentary occupations in predisposing to consumption.

"In the small towns of France," he says, "where the population is composed of agriculturalists, of artisans, and of a middle class (bourgeoisie), the proportion of mortality from phthisis does not exceed one in 40 or 50, when these towns are situated on the acclivity of mountains, on elevated

plateaus, in dry valleys to which the winds have free access, or in fertile plains. But, under these conditions, the disease does not develope itself with the same degree of frequency in the various classes of the population. It is very rare among the agriculturists or artisans, who exercise their limbs actively; it attacks, on the contrary, almost exclusively sedentary persons who are habitually within doors, who only exercise their hands or their fingers; who do not expose themselves to the action of the air, and consequently to atmospheric vicissitudes. Hence consumption, and tuberculous diseases in general, prevail almost exclusively among sempstresses, turners, &c. Pulmonary consumption is especially frequent among young persons, or females of the middle class, who lead an inactive life; whereas butchers, carters, drovers, &c., as also women who expose themselves to the vicissitudes of the atmosphere in country localities, and to the severity of the seasons, are generally exempt. In climates, or particular localities, where the fatal influence of humidity is not exerted, this law is general, and the exceptions only confirm the rule.

"Yet further—those individuals who are exposed to the action of humidity only while at work, scarcely ever become consumptive or scrofulous, when they employ actively their physical powers, as tanners, wool-washers in manufactories, dyers, &c. The expansive and sudorific influence of muscular exercise suffices to preserve them from consumption, though they are often liable to rheumatic pains,

indicating the decided action of humidity upon the skin. I have observed this fact at Rouen among the dyers, who work in great numbers upon the little river Robec, at Lyons, at Vienne (Rhone), and in all the manufacturing towns which I have explored in the course of my travels. In the agricultural villages of France, where there are no sedentary occupations, and all the inhabitants are engaged in field-work, the proportion of deaths, from consumption, is not greater than one in 80 or 100 of the whole mortality.

"In seminaries and convents consumption exerts its ravages, which are evidently owing to a deficiency of exercise and of ventilation. Under these circumstances, the inmates become etiolated, their constitution becomes lymphatic, the bones soften and yield, congestions occur, and at a later period consumption supervenes.

"The sedentary occupations usually pursued in Holland concur with the action of humidity in increasing the amount of pulmonary consumption. That which most disposes women to the attacks of this disease is their lymphatic constitution and sedentary life; for, the women who live in the healthy villages of France, Belgium, and Italy, and who are engaged, like the men, in agricultural pursuits, are like them exempt from phthisis. But in the damp climates of Holland and England, the conditions are no longer the same; the humidity exerts a general influence which muscular exercise cannot always counterpoise; and it often happens

that, by exciting sweat, exercise supplies a greater hold to the weakening and concentric influence of cold and damp.[1]

"In the penitentiary of Auburn, at New York, the prisoners confined in close cells die of slow diseases; 7 out of 10 deaths are caused by consumption. The effect of sedentary occupations on the constitution is remarkably apparent among the silk-workers at Lyons. According to a statement of MM. Brachet and Rougier, out of 250 deaths, 80 are from consumption; in this class of operatives, and, with a few exceptions, in persons pursuing sedentary occupations. Men who live in the open air are very seldom attacked by tuberculous affections, whilst, in the same places, these affections prevail among those who are placed in opposite conditions.

"At Nîsmes, notwithstanding its fine climate, the manufacture of silk favours the development of scrofula and phthisis. The latter disease chiefly results from the work-people remaining within doors; for, at Arles, most of the consumptive patients who died in the hospital had been engaged in sedentary avocations, unconnected with the silk-works. The mortality from pulmonary consumption in this hospital amounts to one third of the whole.

"At Bordeaux, as in the other hospitals of France, Belgium, and Italy, I have not found any consumptive subjects among seamen, fishermen,

[1] Fourcault, op. cit.

men who work on the banks of rivers, or pursue avocations which call their muscular powers into action, either in the open air or in spacious workshops; and in this respect private practice exhibits absolutely the same results.

"The observations which I made in Normandy, in the cloth factories, confirm the preceding facts. The number of cases of consumption, scrofula, and chronic diseases are perceived to diminish in proportion as the workshops are more spacious and airy. These hygienic conditions are met with at Louviers and at Elbeuf. Chronic diseases would be of less frequent occurrence among the work-people of these places, if they were not addicted to the use of ardent spirits.

"At Rouen, the two most general causes of these diseases, humidity and in-door pursuits, exercise a marked influence upon the population. At the Hôtel Dieu, the deaths from phthisis form a fourth of the whole number. The disease is less frequent among the working classes, who are in tolerable circumstances; and, lastly, it is rare and almost unknown among the men at work upon the port, and seamen, as also among the dyers, who are numerous on the little river Robec. The former class of men are robust, well-fed, of a sanguineous temperament, and often intemperate; the latter are pale, thin, and of a lymphatic temperament. In these two classes of operatives, the expansive and sudorific action of exercise suffices to counterbalance the influence of circumambient causes, the humidity

of the climate, and of the places where it is developed.

"It is not the same with respect to the damp and unhealthy quarter of Martainville. The air and light penetrate with difficulty into the habitations; the constitution of the inhabitants presents the character of the scrofulous diathesis. Thus, in large cities, some classes are generally exempt from tuberculous diseases—viz., those who live in easy circumstances, are engaged in occupations, and exercise their physical powers; on the other hand, in some quarters they are very prevalent—viz., in those where a poor and etiolated population languishes in badly-built and unhealthy habitations, remaining mostly within doors.

"At Marseilles, consumption is frequent among individuals engaged in sedentary avocations: it mostly attacks young girls confined in educational establishments, young prisoners, shoemakers, &c., whereas the soap-manufacturers, fishermen, and sailors are generally preserved from its attacks.

"All these facts prove, by the clearest evidence, that in climates which differ in the elevation and inequality of the temperature, pulmonary consumption spares those persons who expose themselves habitually, even while in repose, to atmospherical influences, and to the expansive and sudorific action of light. In Paris, the women of the Halle, coachmen, and others exposed to these influences—in short, all those who lead an active life—are but little liable to this disease. It is seen to prevail, on

the contrary, in the sumptuous apartments of the rich, in the salubrious chamber of the sempstress, and in the abode of the poor man who is engaged in a sedentary avocation." [1]

The effects of want of exercise in inducing pulmonary consumption is further shown in the instance adduced by Dr. Power, some time ago, in a paper on the "Climate of Van Diemen's Land," in the "Dublin Journal of Medical Science." "This climate is very healthy, and consumption is but seldom met with; but it carried off a great number of a tribe of the natives, whom it was found necessary partly to deprive of their liberty on account of their frequent depredations. They were consequently restricted to a small island, commodious dwellings were erected, and they were abundantly supplied with food and clothing. But this kind of imprisonment, and the total change in the habits of this migratory race, was fatal to them; they died in great numbers of pulmonary consumption. Some years ago, however, a better system was adopted, by which their mode of life became more approximated to their natural habits, and the amount of mortality has much diminished. In other classes of the population, phthisis is seldom met with."

Mr. Ancell, in his work on "Tuberculosis," remarks with reference to deficiency of exercise as a cause of consumption and scrofula: "Observation sanctions the opinion that sedentary habits have a most important influence in the production of tu-

[1] Causes Générales des Maladies Chroniques.

berculosis. Infants often become scrofulous from want of those nursing exercises by which the circulating and respiratory functions are promoted, and a healthful hematosis is secured. The same remarks may be correctly made of young children. Habits of listlessness, not to say of indolence, are often the precursors of tuberculosis in young persons about the age of puberty. Dr. Guy found in the close workshops of a printing establishment, that the compositors, whose employment is sedentary, fell victims to phthisis in the proportion of 74 per cent., to 31 per cent. in the pressmen, who, though breathing the same air, and in every respect subject to the same habits of life, differ only in the active bodily exercise of the press; and among the same class of operatives, the deaths from the same cause did not exceed 25 per cent. in those who took exercise in the open air. From the same authority, it appears that in single females leading a sedentary life—as book and envelope-folders, bonnet-cleaners, sempstresses, &c.—the cases of pulmonary consumption, compared with all other diseases, were three times as numerous as among those engaged in non-sedentary domestic occupations, as servants, housekeepers, and shopwomen. In females generally, the smallest proportion of cases were in those employed out of doors. In men following in-door occupations, the ratio is highest where there is least exertion, and lowest in employments requiring strong exertion."

M. Lombard found in Paris, Geneva, Vienna,

and Hamburg, a greater number of persons, leading sedentary lives, affected with phthisis than those leading active lives, in the proportion of 141 to 89. In those cities, phthisis is twice as frequent in those working in-doors as in those who work in the open air. In the hospital for consumption at Brompton, the relative liability was found to be 63 per cent. of in-door males, to 30 per cent. in out-door, and all the consumptive females followed in-door occupations.

Sir James Clark likewise observes on this point: "The effect of sedentary habits is most pernicious, and there is perhaps no cause (not excepting hereditary predisposition) which exerts such a decided influence in the production of consumption as the privation of fresh air and free exercise. These operate as the principal causes of its greater frequency among females of the higher classes."

Other causes are, however, operative to a certain extent in inducing consumption more frequently in females than in the opposite sex. Their blood contains a greater quantity of water, and a smaller proportion of globules than that of males, and, consequently, becomes more speedily deteriorated when exposed to influences of a noxious nature.[1] The heart, arteries, and lungs are smaller, and have less structural density in women than in men generally; hence their circulation is more feeble at the peri-

[1] According to the estimate of M. Le Canu, the proportion of globules in the same quantity of blood, in both sexes, is as 99 to 132.

phery of the body and on the surface. It is a matter of common observation that females of the upper and middle classes are easily chilled in cold weather, and that a large number of them are subject to cold feet and chilblains. The greater susceptibility of their system renders them, moreover, more liable to be affected by the divers causes of super-excitation, and by the depressing mental influences which are inseparable from an artificial mode of life and a high state of civilization.

As connected with the effect of the impression of cold or damp upon the surface in inducing tuberculous disease, I may observe that too light clothing, and the exposure of parts of the body, as the neck, chest, arms, legs, and feet of delicate females, or of children who possess but little reactive power, must be enumerated among the most common causes of the disease, and of promoting its development where the predisposition exists.

The action of cold upon the skin under these circumstances, not only represses its exhalent functions, and tends to occasion a congestive state of the thoracic and abdominal viscera—and, as a consequence, acute or chronic inflammations of these organs, or of their serous and mucous membranes—but also, by depressing the vital energies, favours the supervention of cachectic states of the system. Habit will, it is true, frequently enable persons to bear the impression of these and other deleterious agencies without experiencing any immediate bad effects, though their action may be gradually under-

mining the health, while they often give rise to unpleasant sensations and indispositions, of which the cause is unknown to the patient and his friends, and very commonly to the practitioner, who vainly seeks to remedy them by medicines.[1]

Adverting to the gradual detrimental action of cold upon children and young persons of the upper classes, who are frequently too lightly clothed, a well-known author, whom I have already quoted, observes: "They do not feel the cold, but they experience an uneasiness and an indisposition which arises from it; their constitutions become deteriorated by passing through the alternations of health and disease, and they sink under the action of an unknown cause. It is the more likely to be unknown, because the injurious effects of cold do not always manifest themselves during or immediately after its application, and the constitution is altered without the cause being suspected. The use of warm clothing is often declined, even though the want of it may be actually felt, from the wish to reserve it for an advanced age. But it frequently happens that this very precaution is the cause of preventing that age from being attained."[2]

[1] "The resident in the hot climate returns to his far colder home. There no heat leads the blood to the surface; it accumulates in the enlarged capillaries of the internal viscera. The outward appearance is that of anemia, while in reality an internal plethora frequently exists."—Martin, "Influence of Tropical Climates on European Constitutions."

[2] Edwards, op. cit.

The effect of depressing passions and emotions has been too little considered by medical practitioners as strongly tending to produce tubercular cachexy; and yet the influence of this cause is, perhaps, more generally exerted than that of any other, both in deteriorating the blood, and in lowering the nervous energies, by which the system is rendered less capable of reacting against deleterious external agencies. This cause likewise acts by impairing digestion and assimilation by disinclining persons to exertion and to muscular exercise, and consequently by impeding the capillary circulation and checking the action of the skin; whence arise, as we have seen, a congestive state of internal organs and the retention of excrementitial matters in the blood.

Laennec, referring to the great part which should be ascribed to moral causes in inducing phthisis, even went so far as to say, that almost all persons who became consumptive without being thereto constitutionally predisposed, appeared to owe to these causes the origin of their disease. In fact, the destroyed illusions, the deceived hopes of the realization of expectations too often exaggerated, by vicious systems of education, the difficulties and anxieties which so commonly beset the path of life, &c., may well be regarded as mainly instrumental in the production of organic disease, and especially of pulmonary consumption.

"When the equilibrium of the moral acts is destroyed," remarked a late medical writer—no less

distinguished on account of his learning than for the elegance of his style—"we may be sure that that of the vital actions will speedily be so. The physician, Elie, maintained that four-fifths of men die from grief; an assertion much less paradoxical than might be supposed; for truly, there are few diseases which, in the actual state of our civilization, are not the reflex action of some strong moral affection. It is the certain result within a given time, which must be measured according to the violence of the attack and the individual disposition. Aneurism, liver enlargement, scirrhus, softening of the brain, most nervous diseases proceed more or less directly from some misfortune, experienced, it may be, long before, but of which the weight, the remembrance have at once broken down, or gradually weakened the springs of life. No one, therefore, dies of grief, of despair, nor of lost illusions; it is gastritis, pericarditis, apoplexy, which take the place, by their evident effect, of the real and active, though hidden principle of so many evils. Acute and profound moral suffering is, then, the point of departure of the greater number of organic alterations."[1]

If the inferior classes of the population are less frequently affected by causes exclusively of a moral nature than their superiors in station, the same result is often produced by excess of labour, de-

[1] Reveillé-Parise—Études de l'Homme dans l'Etat de Santé et de Maladie.

ficiency of suitable food and habitations, and by other anti-hygienic causes to which this class is particularly exposed.

The effect of an impure air laden with carbon is very apparent in young persons of the lower class, who are employed in workshops in our manufacturing towns, many of whom acquire the scrofulous or tuberculous diathesis; and when to this cause is superadded the action of cold and humidity, they succumb in great numbers.

M. Lombard estimated that phthisis is twice as frequent among the bulk of the population as in that part of it which lives in easy circumstances. From a statistical account, published by M. d'Espine, in the "Annales d'Hygiène Publique" (1847), the mortality from consumption amounted to 155 per 1000 of the general population; among those in rich and easy circumstances, only 68 deaths in 1000 were attributable to this cause; whereas, among the poor, the proportion amounted to 233 per 1000. It must, however, be observed that this statement has reference more especially to Geneva, where the upper classes lead regular lives, abstaining from dissipation, and are consequently comparatively little exposed to the superexcitation, and to the various depressing moral and physical causes, to which is subjected a large proportion of persons of the upper classes of other countries, especially in large capitals, as London or Paris, and which contribute greatly to increase the number of deaths

from phthisis, particularly among those who are predisposed or of weakly constitutions, of whom many succumb in early youth.

The consideration of the part which is to be ascribed to hereditary tendency in the production of phthisis is foreign to the subject which I have undertaken to treat. Whether the predisposition to the disease be hereditary or acquired, the principles of prophylactic and curative treatment by climate and other means of rectifying the morbid disposition of the system, would be about the same in both cases. The only other cause to which I need refer, as having been considered mainly instrumental in inducing tubercular disease, is a disordered condition of the digestive apparatus. Dr. Wilson Phillip described, many years ago, a form of dyspeptic phthisis, of which the principal characteristic, as revealed by autopsic examination, was the disorganization of the liver.[1] More recently, Dr.

[1] On examination, M. Louis found that of 127 subjects who died of consumption, 47 had the fatty state of the liver, which is also frequently met with in scrofulous subjects, but almost always there exist at the same time tubercles in the lungs. M. Andral considers that this degeneration arises from a defective nutrition, deducing his opinion from a law of the economy, viz., that whenever an organ becomes atrophied, fatty matter is secreted around it, and even in the place of its molecules. M. Mérat considers that it depends upon the vitiated state of the blood, which, when respiration is impeded, becomes more carbonated and oily, as does also the bile. Dr. Wilson Phillip believed that it preceded the tuberculous deposit, of which, however, it is one of the most frequent effects. According to M. Boudet, the proportion of adipose matter amounts to eighteen times as much as in the

Todd described a "strumous dyspepsia," which he considers to be the almost certain precursor of the development of tubercles in children. Many children, however, become consumptive without being either scrofulous or dyspeptic, and in many of those patients who have passed the period of puberty, the function of digestion is well performed, or is subject only to slight derangements up to an advanced stage of the disease. On the other hand, but few dyspeptic patients become consumptive, unless predisposed to the disease, or exposed to any of its more active causes. In persons predisposed, or of a delicate constitution, derangement of the digestion (which often ensues from the operation of moral agencies) may become an active cause of tubercular cachexy, on account of the impediment which it presents to a due assimilation of the food, and consequently by giving rise to an impoverished state of the blood, lessening the vigour of the circulation, and diminishing the cutaneous and other

healthy structure of the liver; the proportion of cholesterine becomes increased from 1 to 8, while the animal matter is reduced to almost one-half of its normal weight. The accumulation of cholesterine takes place both in the liver and in the tuberculous deposit. This substance consists of 97 per 100 of carbon and hydrogen, being consequently very rich in combustible elements, which require a considerable proportion of oxygen for their being consumed, which they can only be when the respiration is free and active. When this function is impeded, they must necessarily exist in excess in the blood, and be deposited by this liquid in the viscera to which they are distributed.

secretions; but in general such derangement cannot be considered in the light of a primary cause.

A distinguished American physician remarks on this point: "Those who maintain the opinion that imperfect digestion and the mal-assimilation of food is a leading cause of the tuberculous deposit, have failed, I think, to establish the fact. The symptoms of dyspepsia, though they may precede and attend the early development of the disease, are by no means of very frequent occurrence. You will constantly meet with cases in which the digestive powers possess the average degree of healthy action, until, in the progress of the case, they begin to fail from the general weakness which the disease produces. This is what you must expect in all chronic diseases, especially those in which debility is a prominent symptom." [1]

"Some physicians have thought," adds Dr. Swett, "that the disorder arising from the menstrual suppression might lead to the deposit of tubercles in the lungs; the reverse of this is much nearer the truth. Suppression of the menses is sometimes one of the first—perhaps the very first—prominent symptom, and a careful scrutiny of the case will often discover this to be the fact."

The lesions met with in the digestive organs are usually consecutive, with the exception of tuberculization, which may precede or co-exist with tubercles in the lungs or bronchial glands, but is

[1] Dr. Swett, Physician to the New York Hospital—Lectures on Diseases of the Chest. 1852.

likewise frequently consecutive to the pulmonary tuberculization. When the mesenteric glands are implicated in children, "strumous dyspepsia" may precede the manifestation of pulmonary phthisis, which it may also do in some cases where there is no organic lesion, without its being necessarily a cause of the disease.

CHAPTER V.

EFFECT OF CLIMATE ON TUBERCULOUS DISEASE.

In estimating the effects which climate is calculated to produce on those predisposed to, or labouring under tuberculous disease, our attention should be directed in the first place to the general condition and circumstances of patients, as well as to the more or less advanced stage of the disease; and subsequently to the various accessories to the action of climate which powerfully conduce to a restoration or an amelioration of the health, but of which the absence often neutralizes the beneficial influence of this remedial agent. Many individuals predisposed to or affected by consumption, must necessarily be debarred from profiting by the advantages offered by change of climate, either on account of family or other reasons which prevent them from travelling, of their poverty, or from the

acute nature and rapid progress of the disease, as when it supervenes on some other complaint.

In those cases which present little hope of permanent amelioration, the practitioner is restricted to endeavouring to afford relief in palliating the urgent symptoms resulting from the local lesion, which requires all his attention; but in the more chronic forms of the disorder, which are the most frequent and commonly met with among the richer classes, the case is different. Here, the disease pursues a course of several months, or years, being usually preceded by a manifestly deranged condition of the general health; the tubercular deposit, instead of being disseminated throughout the whole pulmonary structure, is restricted within more or less circumscribed limits; more time is consequently allowed for the adoption of suitable means of relief, and if the disorder be of recent date (especially if there be merely a cachectic state, without indication of organic lesion), we may reasonably hope that in many cases, by attempting to improve the patient's general condition, and to remedy the abnormal alteration of the blood, by means of climate and other hygienic and medicinal agencies, we shall succeed in obtaining permanent cures; for, the chief thing to be apprehended is, not the existence of some tubercles in a circumscribed portion of the lungs—since experience has proved that these bodies may remain in a crude state for a long period without very serious disturbance of the health, and even without their existence being sus-

pected, that they may be absorbed, may undergo the cretaceous transformation, or be expelled after the process of softening—but rather the persistence of the tubercular diathesis, which gives rise to successive depositions of the morbid product. It is, therefore, against the diathesis, or the cachectic state of the system, and not against its local manifestation, that our remedies should be principally directed, and it is by placing patients under favourable circumstances of locality, climate, &c., which remove them beyond the sphere of action of the most common causes of tubercular cachexy, and which tend to neutralize the influence of these causes after their pernicious effects have become apparent, that our efforts to cure would be most likely to be crowned with success, provided the deterioration of the constitution, or the organic lesion have not proceeded too far.

The predisposing causes of tuberculous disease are all directly or indirectly of a debilitating nature, and, although the symptoms arising from vascular congestion, inflammation, or irritation of the affected organs, often require the adoption of antiphlogistic or revulsive means, the principal indication in the treatment of the majority of cases, in an early stage of the disease, and before it has manifested itself by urgent symptoms, is to subject the patient to a generally strengthening regimen, adapted to the circumstances of individual cases. From the view which we have been led to take of the nature of pulmonary phthisis, it must be evi-

dent that our attention should be directed, in the first place, to improving the functions of the skin, which are always more or less deranged in cases of phthisis or of tubercular cachexy, from defective or irregular action. The sweats to which patients are liable in the more advanced period of the disease are no contradiction to this position, as they consist of partial or general transudations arising from debility, increased arterial action, and a want of tone of the secreting organ. Now, when the vascular system is deficient in vigour, it is in the capillary circulation of the surface and periphery of the body that the effects are most apparent, the insensible perspiration being consequently more or less suppressed. Those measures, therefore, which tend to raise the tone of the system and to increase without too greatly exciting the vigour of the circulation, may be considered as acting the most favourably in remedying the tubercular diathesis; and the best if not the principal means of producing this result are a residence in an appropriate climate, a suitable regimen, change of air, and of mental impressions by travelling in an interesting country. Independently of its other effects upon the economy, the action of a warm and dry atmosphere in winter, promotes perspiration, which, as we have seen, is directly repressed by the influence of a cold and humid, or even of a warm and humid atmosphere. "In hot and damp weather," says an author, who has recently treated of climate, "the cutaneous perspiration is performed with difficulty; a feeling of

languor and of depression is experienced, which makes the heat appear stifling, and renders all exertion insupportable. Thus, while extreme dryness of the air exhausts the body, gives rise to inflammations, and irritates the nervous system, excessive humidity engenders scrofula, rheumatism, &c., accelerates decomposition, produces atony of the system, and even stupidity. On the other hand, a moderate degree of dryness increases the activity of the functions without exciting or exhausting the sensibility; occasions a salutary derivation upon the whole cutaneous surface, and concurs, though indirectly, to maintain a desirable equilibrium of the mind and passions—in a word, to preserve the health." [1]

It has been shown that a cold and dry air has a preservative effect against the attacks of consumption and scrofula; but it would be wrong to infer, that, because in Sweden, for instance, the ratio of mortality from these diseases is smaller than elsewhere, it would be advantageous to send thither patients labouring under or predisposed to phthisis, whose vital powers are greatly weakened. It is true that we now and then meet with or hear of a delicate person who appeared to present the signs of a phthisical disposition, acquiring robust health, by emigrating, for a longer or shorter period, to countries where the winters are excessively cold, and at the same time dry (as Canada); but these are exceptional cases, and when change of climate

[1] Foissac—De la Météorologie.

becomes a question for the medical practitioner to consider, it is almost always that he has to recommend patients to choose one of a higher temperature than that in which they have been accustomed to live. This recommendation is, however, too frequently given in an abstract manner, without sufficient regard being paid to the difference of patients' constitutions, their actual condition, and their greater or less power of resisting cold, or what is the same thing, of producing heat. A climate which might be considered mild, and be well suited to one patient, would often, as respects others, be cold and prejudicial; for, if there exist great differences between healthy persons with regard to their power of reacting against deleterious external influences, the difference is still greater in those who are sick or weakened by any cause. An individual whose power of producing heat is diminished, will often bear with advantage a moderate degree of cold for a certain time; but if he be subjected to its influence for a prolonged period, his constitution being no longer able to react against the accumulated action, he would not fail to experience its prejudicial effects upon his health.

After adverting to the results of some experiments upon frogs, made with a view to determine their power of generating heat, M. Edwards proceeds to observe: "Where, therefore, the exposure to cold is prolonged, the effects of each period of the time of the exposure are added to those of the periods which follow it. Hence, individuals of this class expe-

rience a progressive diminution of their faculty of producing heat from the longer duration of the same degree of cold.

"It follows, from the facts which we have stated, that when a person undergoes a change of constitution, which lessens his production of heat, or his consumption of air, he cannot support the same degree of cold, which previously would have been salutary to him, without the rhythm of his respiratory movements being sooner or later altered; hence arises the necessity, when these two functions have undergone this alteration—as in cases of organic affection of the heart and lungs—to place the patient in relation with a milder temperature, either artificially produced, or by causing him to change his climate." [1]

A warm and equable climate, even though it be moist, has a beneficial action upon the majority of persons labouring under diseases of the respiratory apparatus, who come from colder regions; but a prolonged residence in such a climate would frequently not be advantageous to them, on account of the relaxation of the constitution which it generally produces, and which renders them less able to resist the temporary or accidental impression of a fresher air, or the action of a colder atmosphere, on quitting the places of their sojourn. On this account, the natives of tropical climates, when brought to colder latitudes, as also Europeans who have long

[1] Op. cit.

resided in those countries, on returning home, so frequently become consumptive.

We have seen from the evidence of a resident physician at Rio de Janeiro, that a large proportion of the natives of the Brazils die from pulmonary consumption. A writer in the "Gazette Médicale de Paris," (M. Dujat), remarked, some years ago, with reference to the same locality: "At Rio, phthisis is infrequent among the Europeans. M. Levacher says that the progress of the disease in Europeans is retarded in the West Indies; they seemed to acquire a new existence, and lived several years without experiencing any symptoms of their disease; several were able to leave, presenting all the characteristics of an apparent cure." "But," adds this writer, "the patients treated in the military hospital at Chatham, furnish proofs that a prolonged sojourn in hot countries, and the diseases of those countries, give rise to tubercular cachexy." [1]

Sir James Clark remarks, on the same subject: "A long residence in a very equable climate is not favourable to health, even with all the advantages of exercise in the open air. A moderate range of temperature, and of atmospheric variation, seems to be necessary for the preservation of health; whence it follows that many patients who derive great advantage from a temporary sojourn in a mild, shel-

[1] M. Levacher himself admits that these ameliorations are not lasting, when the patients go to a colder climate.

tered position, do not bear a long residence in a similar atmosphere without injury. Dr. Combe, during his stay at Madeira, remarked that the invalids always felt themselves better when the temperature was less steady and the atmosphere more variable, than when the season was unusually mild and agreeable. I have observed the same effects resulting from a long residence in some of the more favoured spots in our own island. Such situations form excellent residences for a time; but afterwards the patients cease to improve, and lose rather than gain in strength. A prolonged sojourn in very mild, sheltered positions, I consider to be unsuitable to young persons disposed to tubercular disease." [1]

"Air in motion," says M. Edwards, "acts only upon exposed surfaces, as the integuments of the body; those of the lungs are sheltered, and notwithstanding their communication with the atmosphere, the agitation of the air has but a slight share in the quantity of vapour which they furnish. This consideration will serve to determine the choice of suitable places for the residence of delicate persons. Those to whom the increase of evaporation from the lungs is injurious, ought to prefer an atmosphere less dry, but slightly agitated when it is important to obtain an agreeable freshness."

An eminent London physician likewise observes: "We must be very cautious not to carry our anxiety too far; for it is an undoubted fact that, within

[1] On Climate.

the limits of moderate hardihood, exposure to the open air and the vicissitudes of the atmosphere is the best safeguard against the attacks of phthisis in those who are predisposed. It is to the effects produced upon the skin that great part of the benefit produced by residence in a mild climate is probably attributable. Atmospheric exposure is another very important point; in our variable climate it is inadmissible."

"It is at this period (the early stage of the disease) that sea voyages, and residence in a milder climate, are to be recommended. If we leave them to a much later period, the sacrifice of domestic comfort and the expense and toil of travelling are undertaken with scarcely a chance of any adequate benefit: whereas, at this time, if the patient be so placed, that for a winter or two he is able to pursue his exercise in the open air, without breathing an atmosphere which at every inhalation irritates the bronchial tubes, and without exposing the surface of his body to be chilled, and the perspiration to be checked at every hour of the day, a great deal of benefit may result, and the cure which is begun may be accomplished, or at all events the progress of the disease be greatly retarded."[1]

Mr. Ancell likewise remarks on this point: "If the blood, either by the resources of nature alone, or by that of nature assisted by art, resume its normal constitution and its healthy vitality, the local affection, if no vital organ be extensively diseased,

[1] Bright and Addison's Practice of Physic.

will get well spontaneously. Our curative principle is peremptorily to prescribe air, and to endeavour to select such a locality, and such a climate, that the patient may be out of doors at all hours of the day, and all the days of the year. One great desideratum is uniformity as respects pressure, moisture, and temperature, and another, freedom from pernicious winds. A rarefied, light, and comparatively dry and equable atmosphere is to be preferred." [1]

These quotations from the works of practitioners who have had considerable opportunities of treating pulmonary consumption, and of appreciating the effect of climate on its progress, may suffice to show that in most cases, where the object sought to be attained is a cure or permanent amelioration, by improving the quality of the blood, a very equable climate is not the most desirable. In the course of my residences at various places frequented on account of their climate, I have had many opportunities of convincing myself of the advantage which patients with chronic diseases of the respiratory organs derive from breathing an atmosphere moderately agitated, as also of the enervating influence produced by a calm state of the air, and a very warm or moist and equable climate, when too long continued.

The air of Rome, for instance, is very calm, being rarely agitated by strong winds; and although a residence there, during the whole of the winter, suits some patients, many others, on the

[1] Treatise on Tuberculosis.

contrary, to whom a few weeks' sojourn would be advantageous, are disagreeably affected, and their general health suffers, not unfrequently being accompanied by an aggravation of chest symptoms, when their stay is prolonged for five or six months. So, also, a change would very often be desirable, after a time, for patients who go to winter in the climates of Madeira or Malaga, especially on the approach of spring, which there sets in early, and when the heat is not unfrequently inconveniently felt during the greater part of the day; but as these places are distant from any others frequented on account of health, the journey could not be effected without considerable risk. Thus, in cases where a very equable climate is not specially indicated, and where there is reason to believe that a change would be advisable in the course of the winter, the Italian places of resort, notwithstanding their atmospherical vicissitudes, present several advantages, especially as respects the facilities of communication existing between them. The character of the climate of certain localities likewise, varies materially in the course of the six months of winter and spring, on which account a change of place is often indicated for patients sojourning there who labour under pulmonary disease, though it is not always had recourse to. It is from these various circumstances having been too little considered, that a great number of patients do not derive the advantage they otherwise might from the beneficial influence of climate, and that some find their condition

rather worse than better from its injudicious adaptation to particular cases.

Again, in several cases of predisposition, or of incipient disease, a certain amount of stimulation of the system produced by a warm and exciting climate would be advantageous, if not of too long duration. A locality, likewise, which might be desirable as respects its advantages of climate, might be unsuited to many patients from its want of resources for occupation and recreation. Cases of phthisis not unfrequently owe their origin, as we have seen, to painful moral impressions which act by undermining the general health; and as respects the majority of patients, mental recreations which afford them the means of occupation in the evenings, or when they are detained within doors; cheerful society, the aspect of a pleasing country, a variety of walks and rides by which monotony of impressions is prevented, conduce materially to promote a cure or to procure an alleviation of their disease. The consideration, as to whether places to which patients with pulmonary disease are recommended possess resources for mental occupation or diversion, is therefore a very important one, and yet it is overlooked by most writers on climate, who seem only desirous to specify the meteorological peculiarities of the places of which they treat. Thus, M. Carrière, in his work on the "Climate of Italy," infers from the equability of climate said to be enjoyed by some places altogether destitute of resources, as Mola di Gaeta, Puzzoli near Naples,

some towns in the Tuscan Maremma, &c., that these would be favourable situations for consumptive patients; but what invalid would think of remaining for any time in similar localities, or what physician would counsel such a course? The same writer mentions Venice as a favourable winter climate, but although it may be better than that of other parts of northern Italy, Venice is open to the influence of the winds from the north and north-east, which, though not frequently severely felt, are at times inconvenient. A three or four weeks' sojourn there in the autumn or spring might be advisable, yet I consider that Venice would be a very unsuitable winter abode for the great majority of invalids. There is no place for riding or driving; the only places for walking exercises are St. Mark's Square, and a circumscribed public garden; there is no society for visitors—most of whom, after having seen the objects of interest which the city contains, find no inducement to prolong their stay.

We have seen that the causes which are most instrumental in inducing tubercular cachexy by suppressing or lessening the excretory and absorbent functions of the skin, and in vitiating the blood, are humidity, a sedentary mode of life, and the depressing passions. Now, the principal advantage of a mild, dry, and sunny climate in winter, is, that it places patients under the most favourable conditions for counteracting the influence of these causes, enabling them to take daily exercise in the

open air, by which the muscular, respiratory, digestive, and cutaneous systems are maintained in healthy activity; whereas, in a cold and damp climate, such persons must necessarily pass many days within doors, breathing the close atmosphere of warmed rooms, and must, moreover, be deprived of the mental diversion which is afforded by the variety of objects met with in walking or riding. Thus in any such climate the quality of the blood becomes improved, and the tendency to the formation of tubercle is diminished. The nervous and muscular systems experience the beneficial effect of this amelioration, which is manifested by an increase of tone and vigour. The *moral* is likewise agreeably impressed by the contrast which sunshine in winter presents to the cloudy and rainy skies of which a lively recollection is retained. "Is it not true," asks M. Foissac, in referring to the effects of light on the disposition of the mind, "that in bad weather the mind is more disposed to melancholy? Is not British spleen occasioned, or at least kept up by the thick fogs which constitute for the inhabitants of Great Britain an atmosphere of dulness and ennui? Are not petulancy and vivacity excited by the aspect of clear skies and sunshine? That they are so is proved by the animated gestures, and the expressive play of features of the natives of southern climes."

A residence in marshy localities has been considered advantageous to consumptive patients, on account of the immunity from the disease which, it

is said, is enjoyed by those who inhabit them, and who, being subject to endemic intermitting fevers, are, by the law of antagonism, exempt from pulmonary disease. Even if this assertion were irrefutable, it by no means follows that patients affected with phthisis should be recommended to select any similar place of abode; for, if they could not escape from phthisis except by being subjected to intermittent fever, they would only have exchanged one serious disease for another. But the immunity from consumption of the inhabitants of marshy districts is far from being proved. Most of these places are comparatively depopulated, which may well account for the small number of consumptive patients there met with. The disease is tolerably frequent in the hospitals at Rome, though less so than in some other large towns of Italy, where anti-hygienic causes are more active among the lower orders of the population.

M. Boudin has more particularly endeavoured to prove the exemption of the inhabitants of marshy districts from phthisis; and also, that places in which this disease is prevalent are remarkable for the rarity of endemic intermittent fevers; but his facts and arguments are not corroborated by the results of the extended experience of several other observers. He remarks, for instance, that "at Madras, where marsh-fevers prevail, out of 17,920 patients admitted into the military hospitals, the mortality from phthisis only amounted to 14; that at Rangoon there were 2,000 patients with fever,

and only 7 with pulmonary phthisis, admitted into the hospital. At New York, where marsh-fever prevails, there is no instance of phthisis appearing in the marshy places. In Africa, at Senegal, phthisis is very rare. Rome, Pisa, Parma, Plaisance, are surrounded with marsh-land, and consumption is much less frequent than at Naples, Genoa, and Nice, where there exist no intermitting fevers."[1]

We have seen that, in the East Indies *generally*, the mortality from consumption among the troops is small, which accounts for the small number of these patients admitted into the hospitals of Madras and Rangoon. At New York, phthisis is very frequent among the inhabitants. It is equally rare in Africa, in parts where there are no marshes; and if it is of less frequent occurrence at Rome, Pisa, Parma, and Plaisance, than at Naples, Genoa, and Nice, it is because the former towns, situated more in the interior, are less subject to abrupt variations of temperature, which act perniciously upon the poorer classes of the latter, at a time when their constitutions have been weakened by the heat of the summer, and by the various anti-hygienic causes already enumerated, to which the populations of Rome, Pisa, Parma, and Plaisance are much less exposed, their streets being wider and more airy, and the inhabitants being much less numerous, in proportion to the size of those towns.

M. Schönlein remarks, that "in the delta of the

[1] Compendium de Médecine, art. cit.

Rhine, at Rotterdam, Amsterdam, and all the parts of the Netherlands where intermitting fevers prevail, tubercle is seldom seen; that in the sandy part of the environs of Brussels, where those fevers are rare, phthisis is very common." The evidence of M. Fourcault, and of other travellers in Holland, proves, however, that phthisis is very common in all the towns of that country. At Brussels, the disease is very common, not only in the sandy part of the environs, but in the city, and the whole surrounding country. The population of the marshy part of the county of Lincoln has been always liable to attacks of intermittent fever, as well as to phthisis. Of late years, from the improved drainage of the marshes, agues have become much more scarce; but it does not appear that consumption has become either more or less frequent. At Bordeaux, where the mortality from phthisis amounts to 28 per 100, M. Gintrac counted 153 cases of consumptive patients to 1,200 of intermittent fever. The right bank of the Gironde supplied 105 cases of ague, and 27 of phthisis. These figures, M. Gintrac concludes, show that there is, between phthisis and intermittent fever, not an antagonism, but a parallelism. M. Gintrac observed, that those *communes* of Medoc which yield the largest proportion of intermittent fevers, likewise supply the greatest number of consumptive cases.

M. Lebert remarks on this point, in his work on "Tuberculous Diseases:" "The opinion that marshy countries, in which endemic agues prevail,

are less liable to phthisis than more healthy countries, was propagated, twenty years ago, by M. Schönlein, and more recently, by the modern School of Vienna. It has especially found partisans among Italian physicians, and, in France, M. Boudin supports this opinion; but it is certain that this law of exclusion comprises a strange exaggeration. We have been able to convince ourselves that, in the marshy parts of the banks of the Rhone, in the Lower Valais, where intermitting fever is endemic, pulmonary phthisis is equally frequent. The same observation has been made by a great number of Dutch and Belgian physicians and by M. Lefevre, who found at Rochefort, where intermittent fever is endemic, on 605 *post-mortem* examinations, 132 cases of pulmonary tubercle. M. Virchouw, who was sent, by the Prussian Government, into a district of Upper Silesia—where intermittent fevers prevail endemically, and where, at the same time, misery reigns in every form, but where scrofulous and tuberculous diseases are very rare—arrives at the conclusion that, if there are some countries in which intermittent fever and tubercles are not met with together, there are, likewise, many others where these two diseases exist simultaneously, without exerting an influence over each other, and that there is, consequently, no law of exclusion. [1]

A residence in a suitable climate has not only a directly beneficial effect in improving the condition

[1] See Appendix.

of patients, but it is likewise indirectly advantageous by placing them under the most favourable circumstances for deriving the full amount of benefit from such remedies as are more particularly indicated; and it is doubtless on account of patients being in unfavourable hygienic conditions that remedies which have been found to be highly serviceable by some practitioners, have so often failed to produce good effects in the hands of others who have tried them on hospital patients, or on those exposed to the anti-hygienic influences of large cities. A tonic plan of medication, for instance, is not unfrequently beneficial in incipient phthisis, even under disadvantageous circumstances of locality, mode of life, &c. Iron is the remedy of this class which has been the most highly spoken of, and I have employed it in several cases of pulmonary disease with good effects. M. Dupasquier, a French provincial physician, experimented largely with the proto-ioduret of iron in cases of consumption, and speaks highly in its favour, even when employed at an advanced period of the disease, when its use would generally be considered to be counter-indicated. "The cough, the sweats," he remarks, "subsided, or were allayed, the circulation became slower, the fever was lessened, the strength and appetite improved even in an advanced stage." ("Gazette Médicale," 1842.)

On the other hand, some of the most distinguished physicians of Paris, as MM. Louis and Andral, state that they employed this remedy with-

out any good resulting from it; and that in some cases the symptoms were greatly aggravated, as indeed must always be the case where remedies are tried experimentally, with but little regard to the circumstances in which the patients are placed. The same may be said of revulsive agents—as issues, setons, &c.—the use of which is often attended with marked benefit when the hygienic condition of patients is favourable, but which often fails to afford relief under circumstances of an opposite nature, as for instance, in hospital patients.

All the physicians practising at places frequented by patients labouring under pulmonary disease, ascribe the want of success, and the disappointment frequently experienced by patients and their friends, of their expectations of the advantage to be derived from climate, to the circumstance either that patients arrive in too advanced a stage of disease to be materially benefited, or to their want of precaution in guarding against atmospheric transitions, and to the neglect of hygienic rules, the observance of which is rendered imperative by their condition. I have frequently had occasion to witness the bad effects resulting from these causes. Patients, on seeing from their residences or from sheltered gardens the sun brightly shining, are apt to go out on foot, on horseback, or in a carriage, too lightly clad, and unprovided with extra garments to put on when passing through a colder atmosphere, to the action of which their previous exposure to the sun will have rendered them more susceptible. They like-

wise frequently remain out later in the evening than they should do; attend parties, and on leaving heated rooms expose themselves to the night air, commit errors with respect to diet, &c., whence they seldom fail to experience evil consequences, which are too often laid to the account of the climate.

Sir James Clark justly remarks on this point: "Among the numerous circumstances which require attention in recommending a change of climate, one of much importance is often entirely lost sight of, both by the physician and his patient. We mean that necessity of perseverance in the regimen and mode of life which the peculiar nature of the disease demands. This must be urged upon the invalid as the condition on which alone he can expect to derive benefit from the proposed measure. We are satisfied from ample observation, that change of climate has not been productive hitherto of all the benefit which it is calculated to effect; nay, that it has often done positive mischief, chiefly on account of the inconsiderate and injudicious manner in which it has too generally been prescribed and carried into effect." [1]

Mr. Ancell remarks on the same subject: "I have known several tuberculous individuals who have been to Madeira, and returned with their health completely restored; but on questioning them, I find that they have lived twice or thrice as much in the open air as they were accustomed to do at

[1] Cyclopedia of Practical Medicine, art. Climate.

the corresponding seasons of the year at home. They have also taken infinitely more exercise, and that of a gentle and salutary kind; they have been relieved of many of the harassing cares of life, and followed out judicious directions as to their diet and habits. I have been informed of others who have gone out under equally promising circumstances, but have fallen into irregularities and dissipations; have adopted the converse of these hygienic customs, and have not only received no benefit, but their disease has progressed even more rapidly than it would have done had they remained at home."

M. Andral, considering that the maximum of frequency of phthisis is in countries where there exist great and irregular variations of temperature, recommends patients to avoid Pau—which, however, is a very good locality in some cases—while, as respects Nice, he thinks that physicians have been wrong in recommending it as a place of winter sojourn, for "the variations of temperature are frequent, and there are a great many sick persons." "The shores of that part," he adds, "are very injurious to phthisical subjects, but in the interior of Italy the climate is less dry and exciting to the pulmonary apparatus. A residence at Rome is, on the other hand, favourable to them. You will, therefore, advise patients to go to Rome in October, to pass the winter there, and to leave it in May. The island of Madeira combines all the conditions favourable to consumptive patients. During winter, the temperature is 12° higher than in Italy; the sum-

mer is less hot, and especially less variable; the mean range is only 1°, and there are only 73 rainy days in the year, while at Rome there are 165 (days on which rain falls); and yet, notwithstanding all these circumstances, phthisis is not rare at Madeira, and patients who go there to seek a cure, only find a longer or shorter prolongation of their sufferings." [1]

This advice, which is very good as respects certain cases, is not so with respect to others. A residence at Nice, for a longer or shorter period, in winter, suits several patients labouring under pulmonary consumption in the earlier stages; and we have seen that phthisis is most frequent in places where the climate is characterised by humidity, while, on the other hand, it is comparatively uncommon in most localities where the climate is dry, even in some where there are considerable variations of temperature, and that the majority of persons who are exposed to atmospheric vicissitudes—unless of naturally weak constitutions—generally enjoy good health, and are seldom attacked by phthisis. M. Louis remarks, with reference to this point: "In the Ionian Islands, where the temperature undergoes great and abrupt variations of temperature, phthisis is not more frequent than at Malta, which is so renowned for the mildness and equability of its climate. On the other hand, of two countries placed under analogous conditions of climate, the Ionian

Islands and Jamaica, phthisis is much more common in the latter." [1]

Jamaica is, however, not exactly under analogous conditions as the Ionian Islands. Its climate, like that of the other islands of the West Indies, is considerably hotter; it is also more humid, though less liable to frequent atmospherical variations than that of countries adjacent to the Adriatic and Mediterranean seas.

In Algeria, the variations of temperature are frequent and abrupt, and yet phthisis is of very rare occurrence, especially on the coast, notwithstanding that a great quantity of rain falls (at Algiers) in the winter months, but where, as I have shown in the notice which I have given of this locality, the atmosphere is not moist in the daytime.

When, therefore, we seek to estimate the degree of influence which climate in general, and the climate of particular localities, is calculated to exert in cases of tubercular disease, we must take into consideration all the circumstances which are likely to promote or prevent its beneficial action, as well as the particular conditions of patients; both as regards their general health, and the state of the affected organs. When tubercles have been found to exist in the lungs, the practitioner who contemplates recommending a change of climate, will endeavour to ascertain the extent of the lesion;

[1] Recherches Anatomo-Pathologiques sur Phthisie.

whether or not the disease be simple, or complicated with disease of other organs; and when such complication exists, he will have to consider whether it be such as to counter-indicate the recommendation of the kind of climate which otherwise might seem to be most suitable. In a large proportion of cases, phthisis in an early stage exists without any very notable complication. In some cases the complications met with are consequences of the tuberculous deposit, or are accidental, as when there is bronchitis, which, as we have seen, will not of itself suffice to produce pulmonary phthisis.

In general terms, it may be said that in the majority of cases of the disease in an early stage, when the patient's strength is not materially lowered, and when there does not exist any undue susceptibility of the respiratory apparatus, the beneficial influence of a change would be likely to be so much the more apparent in proportion as the places whose climate appears to be suitable, combine the most inducements to be much out of doors, with resources for in-door occupation at other times. A mild, dry, and somewhat exciting climate, where the air is moderately agitated, without too great or sudden variations, would be best calculated to procure the removal of tubercular cachexy, and to prevent any further formation of tubercle, by improving the deranged functions of the skin, of digestion and assimilation, when these are defective, and consequently the state of the blood. On the other hand, where the disease occurs in subjects of an excitable

or nervous temperament, and where from this cause or from the more advanced state of the disorder the circulation is accelerated—if the breathing be difficult, with much cough, and especially where hæmoptysis has repeatedly ensued—the most urgent indication will be to allay the morbid excitability of the system, which would be best effected by a climate of a different character to the preceding, viz., a warm, calm, and somewhat moist atmosphere, which would favour the repose of the organs of respiration and circulation. In a climate of this kind, however, though patients would often feel themselves relieved, and might continue to live in comparative comfort for a lengthened period, there would be less likelihood of the blood regaining its normal condition, than if they were in such a state as would enable them to bear, without inconvenience, the action of a more bracing atmosphere; and on leaving such a climate, they would frequently be liable to experience a recurrence of the symptoms which had subsided under its sedative influence, on being exposed to the greater atmospheric variations which they would have to encounter elsewhere.

The length of time that patients should remain in a climate which the state of their case seems to indicate, necessarily varies according to circumstances. Most places which would be suitable for a winter's residence, would be unsuitable in the summer season. For many patients affected with tuberculous disease in a slight degree, one, two, or

three winters passed in appropriate localities, aided by such other means as their state may require, would not unfrequently suffice to re-establish their health. Several would often derive more advantage from changing the place of their abode, than from returning successive winters to the same locality, and sometimes even from not remaining the whole of the winter in the same place. It is, however, only after careful examination of the circumstances of each case individually, and of the changes which may have taken place in patients at various times, that the practitioner would be able to judge of the locality and kind of climate which would be best adapted to answer the indications, as well as of the cases in which it would be advisable for patients to have recourse to the remedial agency of change of climate.

A marine climate has often been found advantageous in the earlier stages of tubercular disease, and it is so, doubtless, more on account of the moderate agitation of the air in the sheltered positions on the coast which are usually chosen, than from its impregnation with saline particles. As respects the Mediterranean, it has been demonstrated by experiment, that the air on the coast, as well as on vessels, does not contain any saline matter when the sea is calm.

On the coasts of the Atlantic and North Sea, where there are tides, and where the sea is continually in a state of agitation, the air is impregnated in a certain degree, but it is questionable

whether this impregnation has much share in the invigorating effects which patients not unfrequently derive from a residence on the coast, and from sea voyages. These effects are rather to be ascribed to the constant renovation of a pure air, which acts in promoting the free performance of the functions of the lungs, of the skin, and of the digestive apparatus. A residence near salt-works, and the inhalation of the air impregnated with the vapour from the boiling pans, have likewise been regarded as a preservative against consumption, and also as a curative means, from the circumstance that the men employed in these works are very seldom attacked by the disease; but the same exemption is met with among other classes of men who pursue out-of-door occupations. M. Lebert, who lived several years at Bex, near the Lake of Geneva, where there are extensive salt-works, remarks, that he never knew a labourer employed in these works who became consumptive.

"It must, however, be observed," he adds, "that only strong men are received as workmen; they only work eight hours a day; they are well paid, are almost all cultivators of land, and they live in a healthy and prosperous country. But, admitting the conservative influence of a residence near salt-works, are we justified in inferring from this, their curative action? I think not; I subjected several consumptive patients of the neighbourhood to the habit of walking around the evaporating houses, and of breathing the warm air from

the boilers during the coction of the salt; but I have not seen result from this practice any other effects than those which might reasonably be ascribed to the favourable hygienic conditions under which the patients were placed; the mild and sheltered air, a fine country, milk of excellent quality, and good food." [1]

Sea voyages have been recommended from the earliest periods as a means of curing consumption; and their influence in strengthening a delicate constitution, and, consequenly, in frequently preventing the formation of tubercle in persons thereto predisposed, has probably not been over-estimated.

Several writers mention cases of phthisis apparently in an advanced stage, said to have been cured by this means. A modern author (M. Bricheteau) in his work on the diseases of the organs of respiration, speaks favourably of voyages, and considers that the benefit derived is attributable to the sea-sickness which they produce. His favourite mode of treating consumption is by emetics, which have likewise been highly praised by some British practitioners, though their employment has not been followed by favourable results in the hands of others.

When emetics render service in this disease, it is, I conceive, chiefly because they give rise to active perspiration; and sea-sickness may likewise occasionally be of use in this manner; but in long

[1] Des Maladies Tuberculeuses. Paris, 1852.

voyages, it seldom lasts more than the first few days, and, when of longer duration, would produce great exhaustion in persons already weakened by disease. It has, moreover, the disadvantage of confining patients to the close air of their cabins, whereas, in order to derive advantage from sea voyages, they should be much on deck, and able to take exercise, in order that by the constant renovation of the air, the functions of circulation, respiration, and digestion may be more perfectly performed, and the insensible perspiration promoted. It is, therefore, essential that patients who are recommended to try the effect of sea voyages should have a certain amount of strength, that they should like the sea, and that the disease should not have made much progress.

In the more advanced stages where the aid of medicine is continually needed, as also when the patients are in a weak state, or when from want of resources they would be likely to experience disgust and ennui from the monotonous mode of life pursued at sea, long voyages would generally be prejudicial. Short voyages of a few days' duration, as when patients are going to or returning from places of winter sojourn, would be frequently beneficial, where the effects of sea-sickness are not apprehended. It is, therefore, only to a small number of patients (chiefly of the male sex) that long sea voyages would be suited as a remedial means.[1]

[1] See Appendix.

On the other hand, land journeys, in a carriage, on horseback (or even on foot, when patients are sufficiently strong), through an agreeable country, would mostly be attended with good results, provided they be not counter-indicated by the patient's weakness, or by the excitement to which the act of travelling gives rise.

On land journeys, as on sea voyages, the air being constantly renewed, produces greater activity of the functions of organic life; there is less susceptibility to cold, and the stomach is less liable to be prejudicially affected by articles of diet which at other times might disagree.

Travelling by land has, moreover, the great advantage over voyages, that the patient's mind is occupied and diverted by the incidents of the route, and by the variety of objects which continually prevent his attention from dwelling on sombre thoughts which his state of health is so calculated to inspire; this circumstance materially conduces to remedy a cachectic condition of the system, and to prevent the extension of existing local lesion.

"Travelling," says M. Fournet, "operates a favourable diversion both on the moral and physical life. It breaks the dull monotony which usually attends a secluded mode of existence; the uneasy reflection, the feeling of helplessness which incessantly presents itself, added to the desire to act, contribute to produce and to keep up the general languor of the functions which affects sedentary consumptive patients, and which power-

fully tends to increase the tubercular cachexy. When, however, a person is travelling, the frequent change of sensations and impressions reanimates the functions of nervous system; the reflections, instead of being inwardly concentrated, are exercised upon the variety of objects which presents itself, and a salutary activity is imparted to the whole system; assimilation is easier, and more perfect; the respiratory organs can bear an atmosphere more variable in its temperature; the respiration seems to be better effected; the slight fatigue of the day makes the sleep more refreshing. The morbid impressionability to outward excitants diminishes daily, and allows bright thoughts of the future to enter into the mind."

Travelling has, however, its inconveniences, and would not be suited to patients in advanced stages of the disease, where repose is chiefly indicated. In some patients also, even at the beginning of the disease, travelling would produce too much fatigue, or too high a degree of excitation, and it frequently occasions constipation. Thus, as respects this, as well as other remedial means, the cases to which it might be suited require much discrimination on the part of the physician. The same may be said with respect to horse-exercise, which acts as a prophylactic and remedial means when employed in suitable cases, on the same principles as voyages, other out-of-door exercises and avocations.

In cases where the lungs are diseased, or are

disposed to become so, and where there exists, at the same time, considerable debility of the assimilative powers, emigration to a warmer climate is especially called for. A greater quantity of oxygen is inspired by the lungs in cold than in warm countries; consequently, a greater quantity of food is required in order to obviate the inconvenience which the admission into the system of a superabundance of oxygen is calculated to produce in debilitated persons, the activity of whose capillary circulation and cutaneous functions is lessened.

When, therefore, the stomach is not in a state to digest the amount of food necessary to neutralize the effects of an excess of oxygen upon the lungs, it becomes essential to reduce the quantity of this gas which is received into them; this object is best effected by patients residing in a warm climate, where their skin acts more freely with but little exertion on their part.

The necessity of the amount of food being regulated according to that of the oxygen received into the pulmonary system, and of the carbonic acid expelled from it, as well as the influence exercised by an active state of the functions of the skin upon the digestive apparatus, have been well shown by Professor Liebig. "We exhale," he observes, "more carbonic acid in a low temperature, and under a strong atmospheric pressure, than in a high temperature. We must consequently consume by food, a proportion of carbon which bears a relation to this quantity. Thus, in Sweden, more

food is required than in Sicily; in our temperate regions, at least an eighth more in winter than in summer. In winter, when we are in a cold air, where consequently the amount of oxygen is greater, we feel increase in proportion, the want of carbonated and hydrogenated food. When this want is satisfied, the body can resist the most intense cold.

"Reciprocally, hunger gives rise to the sensation of cold. The wild beasts of the Polar regions surpass in voracity those of southern latitudes. Clothing is but an equivalent for food. The more warmly we clothe ourselves, the less desire do we experience for food, for the reason that the body, under these circumstances, loses less heat, and cools less rapidly, and, therefore, the same degree of reparation by means of food is not so necessary. Thus, the quantity of food consumed is regulated by the number of the inspirations, the temperature of the atmosphere, and by the amount of heat emitted from the body.

"The Englishman perceives with regret that he loses his appetite in Jamaica, and it is only by the assistance of strong stimulants that he succeeds in taking the same quantity of food as in his own country; but the carbon of these substances finds no employment in his body, for the temperature of the air is too high, and the enervating heat prevents the body from increasing the number of inspirations, and consequently from placing oxygen

in sufficient amount in contact with the substances consumed.

"Persons whose digestive organs are weak, whose stomach consequently cannot bring the food into the requisite state for combination with oxygen, cannot support the severe climate of England. Their health requires, therefore, to be improved in Italy, or in other southern countries, for they there inhale a comparatively smaller proportion of oxygen, and their organs will still have sufficient vigour to digest a smaller quantity of food. If, however, these patients remain in a cold country, their respiratory organs are ultimately destroyed by the action of the oxygen."[1]

Much has been said, of late years, of the efficacy of cod-liver oil in cases of pulmonary consumption, but this substance appears to have no special action in preventing or in procuring the removal of tuberculous deposits; though, when there is general weakness, combined with a deficiency of the assimilative powers, its exhibition is frequently attended with beneficial effects, when it does not nauseate the stomach, inasmuch as the system is, by its means, supplied with aliment in a concentrated form, which, without being stimulating, can easily be digested, without the powers of the organism being called upon to concur actively in the act of digestion, as is the case with alimentary substances in general.

[1] Chimie Organique.

Other oils have likewise been productive of good effects in cases of phthisis and general weakness. This remedy, though still in great vogue in England, where empirical modes of treatment find most favour, and where one panacea is rapidly superseded by some other, is now much less thought of on the continent, and several practitioners of eminence have expressed themselves in terms not very favourable to its general employment in cases of phthisis. Thus, M. Lombard remarks: "As respects its action in pulmonary tuberculisation, opinions are very much divided; for my part, I confess that, although I have witnessed its failure a great many times, I have, nevertheless, observed in some patients incontestible effects result from it."

"One of us," says one of the compilers of the "Compendium de Médecine," "has made trials with cod-liver oil in several hospitals, without the patients deriving any advantage from its use; the other tried it on several patients, on whose digestive organs it exerted a very unfavourable influence, without in any way modifying the symptoms, or the course of the pulmonary disease. M. Piorry has tried it on a large scale, and his trials have been completely unsuccessful." [1]

[1] The report of the Helvetic Society on the effects of cod-liver oil in cases of phthisis, is thus expressed as respects its general inefficacy: "The only cases which constitute an exception are some patients whose hectic state was sensibly ameliorated, but these instances are not numerous. In general, we have but little

Experience, pronouncing on the value of this remedy, will, doubtless, place it in the category of those medicinal agents which have, at various periods, been unduly praised by enthusiastic partisans, and which, though calculated to be useful when employed with discrimination in fit cases, have subsequently fallen into a comparative, and, perhaps, unmerited neglect, from their not having been found to answer the exaggerated expectations which were raised respecting them; and if the opinion which I have advocated respecting the nature of consumption be founded in reason, (as it appears to be corroborated by the evidence furnished by facts and statistical data), it must be evident that it will be useless to expect to obtain cures, or many durable ameliorations, from the use of any supposed specific or empirical remedies.

To return from this brief digression.—From the preceding remarks may, perhaps, be deduced some general principles by which the beneficial action of climate in tuberculous disease should be regulated. As respects the climates of particular localities, frequented by patients labouring under pulmonary disease, there exists a considerable variety, a knowledge of the peculiarities of which would best enable the practitioner to determine as to the one most likely to meet the indications in any given case. It is foreign to my present purpose to give a detailed

cause to praise the oil in cases of phthisis. We have administered it for weeks and months together, without success, except in some cases, where there was a scrofulous complication."

account of the places most commonly resorted to on account of their climates; but the appended brief notices may serve to convey a general idea of the leading features by which some of these climates are distinguished from each other. Climates may be divided into two opposite kinds, between the extremes of which there exist several intermediate gradations, viz., the warm, dry, exciting climates; and the warm, moist, and sedative climates. Egypt, the south-east coast of Spain, Nice, and Naples, may be mentioned as specimens of the former, though greatly varying from each other, with respect to the degree of warmth, equability, amount of rain, &c. The West Indies, the island of Cuba, and in Europe, Pau, Pisa, Rome, certain localities of the south and south-east coast of England, and of the Isle of Wight, may be regarded as types of the second, and would, as has been already observed, be applicable to a class of cases to which the former might be unsuited. It must, however, be borne in mind, that many patients would derive advantage from one or the other of these kinds of climates taken indiscriminately, solely on account of their passage from a cold and humid atmosphere to one warm and drier, but it by no means follows from this, that a greater amount of benefit would not be obtained from the one than the other, when, after an investigation into the circumstances of any given case, due discrimination is made in the choice of a winter residence. Thus a patient might be bene-

fited by a residence for a period in Rome or in Palermo, though the climates of these two places differ materially in their nature, and yet in his case the climate of the one might be more particularly indicated than that of the other. Again, as I have already had occasion to remark, a change to a climate of a somewhat different character, may be advisable, in the course of a single winter, either on account of the climates of places undergoing considerable changes in the course of these six winter months of the year, or on account of the prejudicial effects which result in some cases from a too prolonged stay in the same kind of climate, even though it may have at first proved favourable.

Although winter is the season of the year when attention to climate is more imperatively required on the part of invalids labouring under pulmonary disease, yet the choice of summer places of abode is highly important, though too often but little considered; most patients, instead of seeking an appropriate locality where they might probably be making progress towards recovery, being satisfied with remaining stationary at this season. It is true, that as far as mere temperature is concerned, provided the heat be not so great as to relax the system, many places in which a residence would be prejudicial in the cold season (as the patient's own home), might suit very well in the summer; but in general patients would derive advantage from passing at least some weeks at places which contain

mineral springs of a character suited to their cases, where the air is generally pure, and where they would meet with mental recreation.

Mineral waters taken internally, and used in the form of baths, vapour, &c.—when there exists no positive counter-indication—powerfully conduce to improve the mass of blood when vitiated from any cause, not only on account of the derivation produced towards the skin, but likewise from the absorption of their constituent principles; and their action upon the system brings patients under the most favourable condition for deriving permanent advantage from the influence of climate, at a later period of the year.

"Mineral waters," says M. Baumès, "can alone produce in the economy general effects which profoundly modify morbid diathesic states. In fact, the excitation usually induced by those waters, the increased activity of the exhalant and secreting functions of certain textures or organs which are more especially charged with relieving the economy of the mineralizing principles which they introduce into it; the interstitial absorption which is likewise rendered more active in textures, and is brought into due relation with the increase of the exhalations and secretions; these are powerful modifications imparted to the nature of different morbid states, and aided by suitable exercise in the open air, which at baths is generally pure, and to a regimen which is altogether different from that which the patient had been pursuing at home,

cannot fail to ameliorate the composition of the blood, and to rectify the vicious tendencies of vegetative life—on the one hand destroying or diminishing the habit of fluxionary movements inherent in the diathesis, on the other, preventing these movements from assuming a fatal form. If to the internal use of mineral waters, be added their external employment in the form of bath, vapour bath, &c., we shall obtain, independently of the effect of their absorption by the skin, the last powerful modification which these agents are calculated to produce on the cutaneous functions, viz., increase of the insensible perspiration and sweat, which are true depuratory discharges. The tendency to internal fluxionary movements is thus destroyed by their being directed to the skin in the increased activity imparted to a normal function." "Climates," likewise observes this author, "exert upon the development, progress, and termination of the diatheses, a well-known influence. The transition from one climate to another singularly modifies the course of diatheses. It is generally in an unfavourable sense that this modification takes place on passing from a warm to a cold, and especially to a cold and damp climate, and in a favourable one on passing from the latter to the former.

"Many diatheses are remedied by the action of a warm climate, because the organism naturally tends to release itself from the germs of disease which oppress it; to impart a more favourable direction to

noxious vital concentrations and to fluxionary movements established in internal organs, especially when it is placed under the most favourable conditions for promoting the activity of the vital actions of exhalation and secretion, which are effected by the skin." [1]

Except in as far as they are connected with climate, it is foreign to my purpose to advert to the action of mineral waters in pulmonary consumption, to which, in an advanced stage, they are but little applicable; but at an early period of the disease, when the object sought to be attained is a cure by improving the condition of the blood, this may be best effected, in some cases, by gaseous chalybeate waters,—when tonics are not contra-indicated—in others by alkaline thermal, or by sulphurous thermal waters. Of the continental alkaline springs, which enjoy a considerable reputation in diseases of the lungs and air passages, may be particularly mentioned those of Ems, which are more especially indicated in cases where a sedative action is required; to this effect the climate of the valley in which the village is situated conduces, being in summer warm, and somewhat relaxing. The saline waters of Mont d'Or, in France, have likewise for a long period enjoyed much reputation in consumptive complaints. These springs rise in a mountainous district, at a considerable elevation above the sea, and as respects climate, the

[1] Traité des Diathèses.

place is altogether under opposite conditions to those of Ems, the air being cool, and even at times cold in summer, and subject to great variations of temperature. Rain likewise frequently falls at this season. The principal part of the treatment consists in effecting a powerful derivation on the skin; copious sweat being produced after each bath. The physician inspector in his report speaks highly of the results of this treatment in cases of chronic bronchitis, and in the early stage of pulmonary phthisis, and I experience no difficulty in crediting his assertions, the principles of the treatment being in accordance with those which I have advocated as being most calculated to procure the removal of tubercular cachexy.

Several of the sulphurous springs which rise in the French Pyrenees have likewise been a good deal used in cases of consumption in its different stages. Sulphur taken internally, and absorbed by the skin, constitutes one of the best remedies for diseases depending upon an abnormal condition of the blood, which it tends to purify by directly inducing beneficial changes in its composition, as also by increasing the activity of the capillary circulation and of the cutaneous secretions. Among the most celebrated of these waters, are Bagnères-de-Luchon, Cauterets, and the Eaux Bonnes; of these, the latter are most frequented by patients labouring under pulmonary disease. This bath is situate in the mountains, at an elevation of 2,300 feet above the sea's level; the air is pure, though but little

agitated by winds, on account of the lofty mountains by which it is almost entirely surrounded. "The climate," says Dr. Taylor, of Pau, "is more sedative than that of other *sulphurous* bath of the Pyrenees, which circumstance, joined to the unirritating quality of the waters, constitutes an efficient remedy, even when the lungs are diseased, by allaying pulmonary irritation. The Eaux Bonnes may be taken, notwithstanding the presence of urgent chest symptoms, in cases where, under similar circumstances, we would not dare to prescribe the waters of Cauterets." [1]

That many patients affected with phthisis derive great advantage from their sojourn at the Eaux Bonnes in the summer season, cannot reasonably be doubted. I have known some, with considerable disease of the lungs, who have been greatly benefited; but these waters are the least sulphurous of all those of the Central and Western Pyrenees; they are little used in the form of bath, and the doses which the inspector prescribes rarely exceed three or four glasses daily. Under these circumstances, I have no doubt that too much has been ascribed to the action of the waters, without sufficient account having been taken of the effects which must necessarily be produced upon the system in general, and upon the state of the blood in particular, by patients living in a pure and rarefied air, at a considerable elevation, and in a sheltered

[1] On the Climate of Pau, &c. London.

position, during several weeks of the most favourable season of the year.

At Cauterets, baths and half baths are frequently combined with the internal use of the water, in cases of pulmonary disease. By these means a revulsive action is produced upon the surface and upon the lower half of the body, to which much of the benefit derived from these waters is ascribed. Cauterets lies 3,000 feet above the sea's level. Its atmosphere is more invigorating than that of the Eaux Bonnes, and is consequently well calculated to remedy the state of tubercular cachexy when not too far advanced, in many patients.

Bagnères-de-Bigorre occupies a delightful situation in the plain at the foot of the mountains, not far from the other Pyrenean baths. Its climate is of a sedative nature, and, though often producing a depressing effect upon persons in health, it is well suited to most consumptive patients in whom there exists a state of general or local excitation. In this respect, Bagnères presents a contrast to Capbern, which is situate a few miles distant, on elevated ground, and where the air, without being sharp, as is the case with the baths placed on a higher level, is yet pure and bracing. The waters of these two baths are slightly saline, and are not calculated to be of material service in cases of pulmonary disease.

Many delicate persons, as also several of those in whom there exists a predisposition to phthisis, but who do not experience inconvenience from slight

atmospheric variations, would find the coasts of the North Sea or of the Atlantic not unsuited for a summer residence—as Biarritz, Dieppe, or Boulogne, in France; Brighton, and other places of resort on the shores of England.[1] In some cases, where there is a sufficient amount of strength, for invalids to undertake excursions, on foot or horseback, in a mountainous and diversified country (as Switzerland or Scotland), they would be attended with advantage.

[1] A young gentleman, with tuberculization of the lungs, whom I recommended to use one of the sulphurous waters of the Pyrenees, and to pass the winter in Italy, became much worse from staying a short time at Pau. On arriving at the Eaux Bonnes, he had great weakness, incessant cough, bloody expectoration, fever, and sweat, every evening. He got somewhat better in the course of a fortnight, when his relatives removed him to Biarritz. On passing through Pau, he again suffered from the depressing effects of its atmosphere; but, after a short sojourn at Biarritz, he improved so greatly that, except on very boisterous days, he was able to take daily exercise out of doors, up to the end of November.

CHAPTER VI.

CONCLUSIONS.

From what has preceded, I think that we are justified in deducing the following conclusions:—

1. Tuberculous disease of the lungs is curable in an indefinite proportion of cases, which proportion would doubtless be greatly increased by the more general employment of climate, and other hygienic and remedial measures, to which recourse has been had up to the present time, only in exceptional cases, frequently when the disease has arrived at too advanced a stage to afford a probability of permanent amelioration from the use of any means. Even when a cure is not practicable, the progress of the organic lesion may often be arrested or retarded by the suitable employment of these agents.

2. The formation of tubercle depends, most probably, upon an impoverishment of the blood, characterized more especially by a diminution of the normal amount of its globules, together with an alteration in its composition; occasioned chiefly by deficient activity of the skin—considered as an excrementitial organ—whence substances are retained in the blood which ought to be eliminated from it, in some of which, chemical analysis has detected the

existence of the constituents of tuberculous matter—and also as a supplementary organ to the lungs in the function of respiration.

3. Statistical documents, as well as the investigations of impartial observers, have shown that pulmonary consumption occurs, much more frequently than elsewhere, in countries and localities where a humid state of the atmosphere predominates, and also that it prevails chiefly among those classes of the population who are most exposed to this and other influences which tend to depress the vital powers—particularly the activity of the capillary circulation—and, consequently, to vitiate the blood by suppressing the cutaneous transpiration (sedentary mode of life, prolonged anxiety, and other depressing emotions, &c.)

4. On the other hand, tuberculous diseases are of comparatively rare occurrence in cold and dry climates where the energy of the circulation, and of the cutaneous functions, is maintained by the substantial food, and by the active mode of life, of the inhabitants, which suffices to preserve them, in great measure (as respects pulmonary consumption), from the pernicious effects of the inclemency and variations of the weather to which they are continually exposed. Consumption is likewise rare in warm and dry countries where the inhabitants live a good deal in the open air, and where the insensible perspiration is kept up, without muscular effort, by the influence of the climate.* On the

* It may be asserted, on the grounds of statistical evidence of

other hand, it is frequent among the natives of several countries where the climate is hot and moist (the West Indies, &c.), on account of the relaxation of the system, and of the repression of the insensible perspiration, produced by the combined agency of heat and moisture.

5. In some localities favoured in point of climate, though tubercular phthisis is seldom met with among the inhabitants in general, it may nevertheless be tolerably frequent among those of the lower orders who are exposed to the influence of the anti-hygienic causes which mostly tend to induce tubercular cachexy in all countries. Many individuals, in such localities, as well as soldiers serving at stations where the mortality from consumption is small among the general population, nevertheless die from diseases of the organs of respiration simulating phthisis, which are often erroneously considered as such.

6. The chief indications in the treatment of pulmonary tuberculization by climate, are, first, to remedy as far as possible the morbid condition of the blood, which constitutes the cachectic state, and, by this means, to prevent or to arrest the formation of the morbid product; and secondly, to allay the general and local excitation occasioned by the organic lesion. These indications are not

the most extended nature, that climates and employments that produce sweat, or that *induce a gentle* perspiration not subject to check, are unfavourable to the existence of scrofula and consumption.—Dr. Martin, "Influence of Tropical Climates on European Constitutions," 1856.

unfrequently opposed the one to the other, and in many cases the practitioner is obliged to restrict himself to endeavouring to fulfil the second, and to palliate the symptoms by pharmaceutical remedies.

7. Change of air, and a residence, more or less prolonged, in warm countries during the winter—the selection being determined by the particular circumstances of individual cases—ought to be considered as the means best calculated to fulfil the first indication, and should be recommended in all chronic cases as early as possible.

8. The beneficial influence of climate in arresting the progress of pulmonary tuberculization, would be so much the more marked in proportion as the disease is recent, and as the patient could be the more speedily removed from the influence of the causes which may have contributed to produce it.

9. The localities which would generally be best suited for the winter residence of patients labouring under pulmonary phthisis, in the early stage, are those which, together with a suitable climate, possess resources for mental occupation and diversion, which would induce them to pass a great portion of their time in the open air, avoiding, however, occasions of fatigue.

10. A prolonged residence in any place where the temperature is very equable and the atmosphere calm, is not advantageous to most patients when the chief object is to procure the restoration of the blood to its normal state. On the contrary, a moderate agitation of the atmosphere is favourable to them by

increasing the insensible perspiration, and by making them, so to speak, breathe by the skin as well as by the lungs. [1]

11. The choice of a climate should be determined by the patient's temperament, the condition of the system, and the more or less advanced state of the disease. In general, warm and dry localities best suit persons of a lymphatic or scrofulous constitution where the circulation is languid; these are, on the other hand, often too exciting for individuals of a sanguinary or nervous temperament, in whom there is irritability of the air-passages, a disposition to inflammation or to hæmoptysis, with acceleration of the circulation. Such patients would more frequently find themselves better where the atmosphere is somewhat moist, not liable to great transitions, and of which the action is consequently sedative.[2]

[1] An attaché to the British legation, at Turin, presenting all the signs of tubercular cachexy, was remarkable, at Nice, some years ago, for the hardihood with which he exposed himself, with his neck almost bare, to the vicissitudes of the atmosphere. I subsequently saw him at Frankfort, to which place he had been transferred, and where, notwithstanding the severity of the winters, he enjoyed good health.

[2] A young officer of nervous temperament became consumptive, in consequence of fatigue and exposure to damp, while at the camp at Chobham. He was sent to Malaga, where I saw him. He had the characteristic pallor of the diseased condition of the blood, hectic fever, and night-sweats. The pulse was quick, and the cough almost constant. Auscultation indicated the presence of tubercles disseminated throughout the lungs, rather than agglomerated in a limited portion of them. The disease made rapid progress, and he died in the course of a few

A similar climate is likewise better adapted to patients in the more advanced stages of the disease, when it is deemed advisable to recommend them a change of climate.

12. Most persons with pulmonary consumption, who are natives of northern countries, would be benefited by a residence, during a part or the whole of winter, in a warm climate, even though it were humid—provided the disease were not too much advanced—from the mere passage from a cold to a milder temperature. Many patients, in whom there exists a state of general or local excitation which requires the employment of sedative remedies, would derive permanent advantage from the action of a warm and moist atmosphere, which would tend to allay irritation and diminish the amount of bronchial exhalations; but the too prolonged influence of such an atmosphere, by relaxing the system, would render most patients liable to an aggravation of the disease, if, on changing the place of their abode, they exposed themselves to the action of a climate having a different character, or of any of the exciting causes of the disease.

13. In many cases of incipient tuberculization, in order to derive all possible advantage from the influence of climate, we should, so to speak, regulate

weeks. On the other hand, a young lady of lymphatic temperament, having tubercles in a quiescent state, in the summit of both lungs, derived great advantage from the climate of Malaga, and was able to pass the subsequent winters in England, being, according to the latest accounts, greatly better in health.

the doses either of stimulation or of sedation. As the sedative action of an equable temperature and a moist atmosphere would, in many cases, be advantageous up to a certain point, and afterwards prejudicial; so, in like manner, that of a dry and exciting climate, which may at first have been favourable, when too much prolonged, not unfrequently causes an aggravation of the symptoms, and sometimes a state of general irritability, which, notwithstanding the use of remedies, persists or increases, unless the patient be transferred to a climate more suited to his actual state; which, however, is frequently not practicable.

14. Among the foreign climates most in repute for their efficacy in retarding the progress of pulmonary consumption, there exists a considerable variety with respect to equability of temperature, the state of dryness or moisture of the atmosphere, the degree of warmth, &c. The climates of Upper Egypt, and the south-eastern coast of Spain, are the most remarkable for their warmth and equability in winter, as well as for the dryness of their atmosphere. To these climates, Hyères, Nice, Menton, Malta, and Naples, approximate nearest as regards dryness, though differing materially in other respects. The West India Islands and Cuba may be mentioned as a type of hot and moist climates. Among the intermediate climates characterized by variable degrees of warmth, equability, and humidity, are Madeira, Algiers, Pisa, Pau, Rome. The two latter have a sedative action, often depressing the vital

powers of persons in health, as well as of many invalids.

15. The atmosphere of marshy localities, where endemic intermittent fevers prevail, is neither preservative nor curative of pulmonary consumption, as has been supposed by some physicians, this disease being tolerably frequent in many of these localities.

16. A residence in the places whose climates are best suited to the particular cases, exerts not only a directly advantageous influence in arresting or retarding the progress of the disease, but, likewise, because patients are thereby placed under the most favourable hygienic conditions for promoting the efficiency of remedies which would otherwise be inefficacious.

17. Sea voyages are often beneficial in the early stage of pulmonary tuberculization, when patients do not labour under urgent symptoms ; when the strength is not much diminished ; when they have a taste for voyages, and are not likely to be prejudicially affected by the monotonous mode of life usually led at sea, and provided there be no grounds for apprehending the exhaustion frequently produced by sea-sickness in long voyages.

18. The advantage which patients sometimes derive from sea voyages mainly depends upon the continued renovation of a pure air, which acts as a tonic, promotes the insensible perspiration, and the activity of the other functions of organic life. The saline impregnation of the sea air may possibly somewhat conduce to its strengthening effects,

though it has not been demonstrated that a residence near salt-works, and the inhalation of an air strongly impregnated with saline vapour, has been followed by special beneficial effects in cases of consumption.

19. Land travelling through an agreeable country is better suited to consumptive patients in general than are sea voyages, because, in addition to the effects produced by renovation of the air, it acts in a favourable manner on the *moral* of those invalids in whom it does not occasion too much fatigue; it can be undertaken in the society of parents or friends; those who travel by land can stop where they please, and they have within reach the medical assistance which their cases may require. It is only, however, when land travelling is undertaken in suitable weather, and by easy stages, that it can be expected to be attended with benefit, and with comparatively little risk.

20. The climate of several places possessing mineral springs is very favourable to many patients affected with tubercular disease, in the summer season. The operation of appropriate mineral waters —when these agents are not contra-indicated— powerfully tends to improve the quality of the blood when vitiated, and to increase the activity of the various secretions, especially those of the skin. It imparts a salutary impulsion to the movements of the economy, and prepares patients for deriving the greatest possible advantage from the influence of a suitable winter climate.

APPENDIX.

APPENDIX.

1. REMARKS ON THE ESSAY TO WHICH WAS AWARDED THE PRIZE OF THE ACADEMIE DE MEDECINE.[1]

THE confidence which many physicians have in sea voyages, and a residence in hot countries, for patients affected with pulmonary consumption, appears to the author to be unfounded. He considers that, if these means are sometimes advantageous, under certain conditions, their advantage has been greatly exaggerated. He does not admit the generally received opinion that seamen are but little liable to phthisis; but being unwilling to trust to his own experience on this point, he has collected numerous reports, transmitted by the surgeons-major of vessels, in the archives of the Council of Health. Thus of 165 cases of phthisis

[1] "On the Influence of Navigation and Hot Countries on the Course of Pulmonary Consumption." By Jules Rochard, Second Chief Surgeon of the Marine in the port of Brest.

supervening at sea among sailors: 103 of the patients died on board; the other 62 were sent back to France, or left in the hospitals of the colonies. (The amount of the marine population among whom these cases occurred, nor the period of time over which they extended, are not stated; consequently, they are but of little use in a statistical point of view.) Brest, which is surrounded by the sea on all sides, reckons the mortality from chest affections as one fourth, and that from phthisis as one sixth, in the general population. (This large proportion is probably owing rather to other circumstances of hygiene, climate, &c., than to noxious influence of the sea air.)

After quoting the names of several physicians who have praised the good effects of navigation, the author refers to the considerable number of deaths hastened by the embarkation of the patients, which he proceeds to show is the rule instead of the exception. If, however, this be so in the cases to which the author refers, it proves that this means of treatment was had recourse to *mal-à-propos,* and without discrimination, in patients in an advanced stage of the disease.

M. Rochard endeavours to show, from statistical data, that the mortality from phthisis among soldiers is very inferior to that among sailors; he gives a table of deaths occurring in the maritime hospital at Brest, according to which the number of deaths from this cause amounts to 70 in the space of eighteen months, of which 29 were among sailors,

marine infantry and artillery, and 3 only land infantry and artillery, 13 workmen of the arsenal, and 14 criminals condemned to hard labour. He observes, however, a little further on, that of the sailors who die at Brest, only a small proportion belong to the population of the town; they come to die there from all parts of the world. He thinks that the preceding result may be ascribed to the cold and humid atmosphere of the town.

The comparison established between the mortality of sailors and of soldiers, as shown by the number of deaths in the military and naval hospitals of Toulon, is favourable to the former, corroborating the general opinion of the relative infrequency of this disease among sailors, of whom a large proportion come from other localities to die at Toulon, as at Brest. Thus, we see that, in 1853, there were among the sailors 21 deaths; in 1854, 2 only being from phthisis; among the marines, 7 in 1853, and 3 in 1854; whereas among the soldiers there stationed, the deaths for the two years amounted to 29. "It will be seen," says M. Rochard, "that close to Hyères, and near Nice, at Toulon, phthisis is more fatal than beneath the dull and cloudy skies of Brittany." Hyères and Nice, however, it should be observed, owe the advantages of climate which they enjoy to the mountains by which they are sheltered, whereas Toulon is very much exposed to winds, especially to the mistral; it is very hot there in summer, and, like Marseilles, it is often very cold in winter.

In 16,612 sailors, and on 82 ships stationed in the West Indies, the southern seas of India, China, the Brazils, and La Plata, there were 691 deaths, of which 91 were from phthisis, or 1 in 7.59; being about twice the number of those occurring among soldiers. "Phthisis produces, therefore," says M. Rochard, "twice as many victims among the seamen and marines in our different stations—*almost all beneath the torrid zone*—half as many more victims as among soldiers in garrison."

A fair comparison of results cannot, however, be made between two classes of men placed under climatic and hygienic conditions so very different from each other. Sailors, in these stations, being for the most part confined on board their vessels, breathe, especially during the night, an impure and stifling air, and are, moreover, exposed to the enervating influence of the climate, which must necessarily render them extremely susceptible to be affected by the atmospheric variations to which they are subjected. From the operation of these causes, combined with that of others, tending to deteriorate the health, it is not surprising that a larger number of sailors should succumb to phthisis than of soldiers garrisoned in a healthy climate, as that of France, or in Algeria, where this disease is very infrequent, for the number of French troops maintained in unhealthy colonies is extremely small. It would likewise be wrong to infer, from the statistical data adduced by M. Rochard in support of his position, that navigation in the temperate

latitudes, undertaken by consumptive patients under favourable circumstances, as well as that of a residence, during the winter season, in localities where the climate, without being relaxing, is moderately warm, would not be generally beneficial to them. The question of the amount of benefit which patients may derive who undertake a sea voyage with a view to their recovery, cannot therefore be determined by the greater or less amount of mortality from phthisis among seamen, who are forced to perform the laborious duties of their calling, and who can neither attend in a suitable manner to their health, nor avoid being exposed to the great vicissitudes of temperature and weather to which they are necessarily subjected.

M. Rochard asks, "What are the reasonings or facts which tend to confirm the opinion that a medium so prejudicial to those who pass their life in it, can, by a singular contrast, become salutary for those who only cross it?" To which I would reply, that this medium has not been found by experience to be so prejudicial to English sailors, who, on board the fleet, or mercantile sailing and steam-vessels, navigate the seas in all directions; and that it is precisely because consumptive patients do not remain pent up on board ship in tropical or unhealthy stations, that they have the choice of the direction of their journeys, as well as of the time they will remain at sea, that voyages are so often beneficial to them — when not counter-indicated by circum-

cumstances. M. Rochard quotes in support of his opinion, eighteen cases, of which, however, he does not give circumstantial details, of seamen and officers, (several of whom were young men), who, at the expiration of longer or shorter periods of time died from phthisis, the development and progress of which in those who were predisposed to the disease, may well have been accelerated by their sojourn in tropical countries; but there is every reason to believe that at least some of those patients would have been subject to the disease, had they remained on shore and pursued a totally different mode of life from that on board ship. These isolated cases prove, therefore, nothing against the reasonableness of sea voyages of moderate duration, undertaken under favourable conditions and in favourable cases. Neither can the circumstance that a small proportion of the convalescents returning from the above-mentioned stations should have died from phthisis on the passage, or after their arrival in France, be considered as proving that sea voyages are almost always prejudicial in cases of phthisis.

M. Rochard further asks: "Is a sea atmosphere very salutary for tuberculous patients?" and he quotes the opinions of some distinguished writers, who consider that it is not. The sea shore, he remarks, is exposed to the ravages of phthisis, which in England occasions a sixth part of the general mortality. The disease is very prevalent on the coasts of the Channel, of the Ocean, of the

Mediterranean. We have proved its frequency in Brest, Toulon, Cherbourg, Rochefort; we will soon demonstrate that it is frequent at Marseilles, Cadiz, Gibraltar, Genoa, Naples, Leghorn, Malta, in the Ionian Islands, and on the innumerable coasts and islands of the torrid zone. We, therefore, share the opinions of the authors whom we have quoted."

It is not necessarily on account of the noxious influence of the sea atmosphere, that phthisis is tolerably frequent in several localities on the coast; but more especially because these localities are unfavourably circumstanced, not only as respects the anti-hygienic conditions under which a large proportion of their population lives, which are the most liable to the disease; but also because these places are extremely exposed to sudden atmospherical changes, as I have endeavoured to shew when speaking of some of the localities, on the Mediterranean coast, referred to by the author, to which no physician would think of sending consumptive patients, (except perhaps Malta, where a residence during a portion of the winter season might be beneficial in certain cases); and if the physicians of Naples do as M. Rochard observes, prevent patients from fixing themselves on the shore, and recommend them the interior of the town, it is not for the purpose of removing them from the sea air, (which, as has been shewn by decisive experiments, is not on the Mediterranean shores impregnated with saline molecules, unless during the brief pe-

riods when the sea is much agitated), but in order that they may avoid the great variations of temperature which affect the whole extent of the shore at Naples, from the contrast presented by its exposition to the full influence of the sun during a great part of the day, on the one hand, and on the other to cold winds from which it is not sheltered, as at some other places by the proximity of mountains.

When towns on the sea shore are favourably situate as respects climate, phthisis is comparatively infrequent among the populations; and several towns on the south coast of England are much resorted to in winter by consumptive patients, who are sent there by physicians, not so much for the purpose of inhaling a marine atmosphere, but to live in a pure air which is constantly renewed, and to avail themselves of the climate in the sheltered position of those places.

As respects emigration to hot countries as a remedial or preservative means in phthisis, just inferences cannot be deduced from an examination of the question, deduced from the statistical accounts with which we have been furnished regarding the mortality which takes place among the troops, and sailors stationed throughout the year in unhealthy localities, or in those which might be advantageous winter residences, but which would be prejudicial at other seasons, or when the sojourn in them is too greatly prolonged, as I have endeavoured to shew in my memoir. It is, therefore, *à tort,* that the author quotes on this point the tables of the

mortality in the British navy communicated to the Admiralty by Mr. Wilson, who says: "Every day there are sent from the northern countries of Europe towards the shores of the Mediterranean, persons affected with suspicious bronchitis, chronic pulmonary catarrh, and even with confirmed phthisis. Well, of the three divisions which we have just passed in review, it is that of the Mediterranean which presents the highest amount of these different pulmonary affections, as well as that of the mortality which they occasion."

Mr. Wilson might have called to mind that those parts of the shores of the Mediterranean, in which troops and ships of war are stationed, are not exactly the places to which patients would be sent. It has been said that, at Gibraltar, for instance, the mortality from pulmonary diseases and from consumption is tolerably large among the soldiers of the garrison; but I have shown, in my work on Spain, that this circumstance is owing to accidental causes, to which the soldiers are specially exposed, and that phthisis is comparatively infrequent among the general population, as well as among the officers, who are not exposed to the same causes of disease, or who, at least, are better able to guard against their consequences by suitable care and precautions.

I have likewise endeavoured to demonstrate, in my essay, that a larger proportion of the cases of phthisis, occurring among the natives of hot countries, as well as among strangers who come to re-

side there throughout the year, supervenes as a consequence of bronchitis and other inflammatory affections of the organs of respiration, which are very often produced by the abrupt changes of temperature in these countries, acting upon constitutions enervated and weakened by the heat of the climate, and consequently that the disease in these countries depends, for the most part, upon a totally different order of causes than those which most frequently give rise to it in cold or temperate latitudes. "Often," says M. Rochard, speaking of pernicious effects produced upon consumptive subjects by variations of temperature, "often, in the equatorial regions, in consequence of a change in the direction of the wind, the thermometer descends to 10° or 12°, and sometimes lower. This sndden depression is felt so much the more strongly, inasmuch as it succeeds to burning heats, and surprises the body while in the state of moisture which is habitual in these latitudes. I recollect how much difficulty we experienced, on returning from these voyages in India, or from the stations in Madagascar, in supporting the cool evenings of Bourbon during the months of June and July. We must not, therefore, deceive ourselves; hot countries have likewise their chills and suppressions of perspiration, and this is so universally admitted, that in the colonies, as in France, the vulgar ascribes to them the majority of acute diseases. I hope, in fact, to be able to prove," adds M. Rochard, "that beneath the torrid zone pulmonary tuberculization

makes more rapid progress than in Europe, and that emigration is fatal to those patients who go *to live there.* This opinion is shared by the principal physicians of our colonies, and by the great body of surgeons who have been enabled to verify the frightful ravages made by consumption in our possessions in Oceania. For many years the physicians of our colonies have protested against the sending there consumptive patients from France. I have already shown that this opinion is accredited in the English navy, and that the physicians of that nation send back to Europe, like us, consumptive patients from their colonies."

It appears to me, that it is not by this mode of examining the subject, that the question can ever be satisfactorily resolved as to the remedial influence which may be exerted by the climate of warm countries in cases of pulmonary consumption.

M. Rochard, as well as the physicians to whose opinions he refers, would judge the question in too absolute a manner, without making the important distinction between the effects frequently produced on health by a residence in tropical countries throughout the year, or even for a longer period, and that which patients labouring under pulmonary diseases often derive from sojourning during the winter months in localities where the climate in this season is warm without being relaxing. Doubtless, if consumptive patients, or those who are predisposed to the disease, remained for the summer season in the same localities, the greater number of

them would find their condition become worse. The following comparison which M. Rochard makes will not, therefore, justify the conclusions which he deduces against the advantages, for many of these patients, of a residence in moderately warm climates, at a proper time of the year. "It suffices," he observes, "to take, in the same country, a certain number of men of the same age, subjected to the same regimen, the same occupations, living, in a word, a similar mode of life, and to send one half of them to hot countries, to keep the rest in France, and to see, at the expiration of some years, in which category phthisis is most fatal among those predisposed to it. This experiment has been made for a long time—it is being made daily, and upon a sufficiently large basis for offering all the desirable guarantees—the only difference existing between them (marine infantry and land infantry), is that of the climate in which they are located. Its influence may, therefore, be appreciated in all its purity, taking the land infantry for comparison. Now, phthisis is much more fatal among the marines."

These latter are, however, not under the same conditions as the troops of the land service, as respects the mode of life. Being stationed in unhealthy localities, as in the West Indies, Martinique, Guadaloupe, &c., their regimen is very different from that which is adopted by soldiers in Europe, and being detained on board ship, or living in the barracks of these colonies, where the atmos-

phere is oppressively hot during great part of the day, and often cool at nights, the marines cannot take the same amount of exercise in the open air as the soldiers who remain in Europe, and their health must necessarily suffer from this cause, as also from the more vitiated air of the dormitories, in which they are crowded together. Most probably, in Algeria, where the climate is not enervating, as in the above-mentioned islands, and where phthisis is of infrequent occurrence among the military, it is likewise rarely met with among the sailors or marines there stationed. A just comparison cannot, therefore—I repeat it—be made between the mortality from pulmonary phthisis occasioned among any given number of tolerably healthy men, of which one half is sent to countries where the climate tends to deteriorate the health, and weaken the constitution, and the other half remains in a salubrious country, to whose climate these men have been accustomed during the whole of their lives.

M. Rochard quotes several cases, without specifying their peculiarities, of navy surgeons affected with phthisis who have gone out to the French colonies without finding their condition ameliorated, and have returned after absences of a year and a half, two, and three years, the progress of the disease appearing to have been hastened by their sojourn in these climates—as, indeed, might be expected. These facts confirm the opinion of Sir J. Clark, and other observers, that enervating heat,

like all that excites and weakens, is extremely prejudicial to phthisical subjects, and justify the conclusion which the author of the memoir draws from them, that the course of pulmonary tuberculization is accelerated in a remarkable manner in intertropical regions, and that all the localities comprised in them ought to be severely interdicted to tuberculous Europeans; but they are valueless as proofs that moderately warm *winter* climates are not beneficial to these patients in suitable cases.

In the second part of his thesis, M. Rochard examines the question, whether a sojourn in hot countries situate exteriorly to the intertropical zone (comprising Spain, the south of France, Italy, Greece, Madeira, the Canaries, Algeria, Egypt, Syria, Asiatic Turkey), would have the privilege of arresting the progress of pulmonary tuberculization.

It does not appear that the author has himself visited these different countries, or that he can speak of the influence of their climates from his personal experience. He says, that after having read what has been written on the climate of Italy, and the south of France, and consulted the resident physicians, "one comes to the conclusion that the illusion disappears with respect to the greater number of localities comprised in these countries, and that tuberculous patients end by succumbing, even in the countries which are regarded as the most highly favoured."

He admits, however, that a residence in places

favoured in respect of climate would be advantageous to patients, not by curing them, but by retarding the fatal term of their disease. "All that can be expected from them is to prolong, to a certain extent, the patient's existence, and especially to soften its termination. The latter advantage would suffice, in my eyes, for sanctioning emigration."

As respects the localities themselves, M. Rochard passes them very rapidly in review. He allows one page for Spain, referring only to Cadiz and Gibraltar—where no physician at all conversant with these places would send consumptive patients as a matter of choice—and making no mention of other localities along this coast, as Malaga, Valentia, &c., which are well suited for the winter abode of many patients. Of the places in France, M. Rochard speaks of Marseilles, Toulon, Montpelier, and Aix, where a residence in winter and spring would be very prejudicial to tuberculous subjects; and also of Hyères, of which he takes his notice of a few lines from the pamphlet of M. Barth; but he makes no mention of Pau, which is much frequented by these patients, nor of Cannes. He expresses himself unfavourably as respects Nice, the notice of which takes up only a few lines, and quotes authors who wrote upon its climate about thirty years ago, as also an observation of M. Bricheteau, founded on the circumstance that a seventh part of the deaths in the hospital was owing to phthisis, viz.: "It is very wrong for physicians to recommend a residence in this town."

The mortality from phthisis at Nice occurs, however, almost exclusively among the lower classes, and depends upon the anti-hygienic influences to which this class is specially exposed; whereas the disease is very rare among the upper classes, as also among the population of the surrounding country; and, consequently, its prevalence among one class in the town cannot reasonably be ascribed to the climate. Moreover, at Nice, and in its environs, there are varieties of climate suitable to many cases of incipient phthisis occurring in certain constitutions; and if patients have become worse during their stay at Nice, this circumstance is not unfrequently owing, as I have elsewhere observed, to their having selected situations unfavourable to their particular conditions.[1]

In his notices on Pisa and Venice, M. Rochard—giving likewise only half a page to each of these towns—takes his opinion from the work of M. Carrière on the Climate of Italy. The climate of Rome, which has been considered as favourable to consumptive patients, is not, according to M. Rochard, so recommendable as has been supposed. It has been said that the proportionate mortality from phthisis is but a twentieth of the general mortality. M. Rochard quotes, however, the authority of M. Tourné, proving that the proportion among female patients is as 1 to 3.25 (on an average of two years, 1834 to 1836). He says, moreover, that this disease is more fatal in the

[1] Nice and its Climate.

army of occupation than it is in France, in an equal number of soldiers.

From these statements, however, no one is justified in concluding that a sojourn in Rome during the winter season would be unsuitable to certain cases of phthisis. The military stationed at Rome are in somewhat analogous conditions with those who remain in the colonies during the whole year, and their health must necessarily suffer from the summer's heat, as well as from the malarious influence of the air at this season and in autumn, which renders them more susceptible to be affected by variations of temperature, and consequently liable to attacks of inflammation of the organs of respiration, and which, in weakened constitutions, are often the precursors of pulmonary tuberculization.

The same may be said with respect to the mortality from phthisis occurring in great part of Algeria, which is much greater than in Algiers itself, where the disease is comparatively infrequent among the military, as well as among the general population. The great heat of the summer, added to the action of the marshy air of some localities, by weakening the constitution, and often giving rise to fevers, visceral inflammations and enlargements, must necessarily favour the supervention of phthisis among those who are exposed to its exciting causes. The testimony of resident physicians in Algiers, as well as of those who have visited it, goes to prove that a residence in this city in the winter is very favourable to consumptive pa-

tients who come from Europe, provided that the disease be not too far advanced, and that many return cured, or in a fair way of being cured. Dr. Mitchell, an English physician, who has lately published a detailed notice of this climate, regards it as having great analogy with that of Madeira, as respects the mildness and equability of its temperature, being, however, more dry and bracing, and consequently as being very advantageous in a great number of cases. It is true that a large proportion of rain falls there (36 inches a year, of which 28 in the six winter months, from November to April), but it falls in heavy showers, which do not last long, and, when once over, the ground dries rapidly, the sun shines, and patients can leave their apartments. "I believe," says this author, "that no invalid would be obliged to remain within doors, on account of the rain, for more than six days during the season of six or seven months;" and he adds, (as I had already remarked in my Essay), that the greatest quantity of rain falls at night, "for," says he, "although, properly speaking, the rainy days amount to 96 in the year, nevertheless, considering the days as opposed to the nights (and it is in the day time that the well-being of patients is affected by the state of the weather), it only rains on 56 days, and, in general, only for an hour or two." [1]

"In Algeria," says Dr. Martin, "a cloud comes:

[1] Medico-Chirurgical Review, January, 1856.

it soon disappears; the sun disperses it, or else it falls in a shower. As soon as the large drops of this rain touch the earth, they are restored to the air in the form of vapour." The climate of Algiers may, therefore, notwithstanding the great quantity of rain that falls there in winter, be considered as dry and bracing. "On taking exercise," adds Dr. Martin, "people perspire freely, on account of the warmth of the atmosphere, but the perspiration is carried off so rapidly that they do not feel oppressed." This effect of a warm and dry atmosphere, in promoting the insensible perspiration, accounts for the rarity of phthisis in Algiers, in Upper Egypt, and in other countries similarly circumstanced; and the experience which has been acquired of the comparative exemption of these countries from pulmonary tuberculization, tends strongly to confirm the opinion which I have expressed as to the chief cause of this disease as well, and points out the means which, if had recourse to at its commencement, would be the best adapted to procure a cure.

It is unnecessary that I should dwell upon the observations made by M. Rochard with respect to the climates of the United States, California, the Cape of Good Hope, Chili, Rio de la Plata, &c., as no one would think of sending there from Europe patients labouring under phthisis; I will, therefore, merely add a few words respecting the conclusions with which M. Rochard closes his memoir.

The author mentions the following localities, in

which the residence may be recommended to consumptive patients. "In the first rank, Madeira; in the second, and about upon a parallel line, Hyères, Venice, and Pisa; thirdly, Rome, Nice; fourthly, some places, the climate of which appears to be favourable, but respecting which experience has not pronounced a decision—Menton, Villefranche, the Bay of Spezzia, the shores of the Lake of Como; and lastly, more extensive localities, respecting which we must still remain in doubt—the shores of Greece, Northern Egypt, Algeria.

"Thus, then," adds M. Rochard, "out of so many countries and towns which have been explored, there only remains to us the positive acquisition of a small island in the ocean, the chief places of a canton in the department of the Var, and four large towns of Italy, two of which inspire considerable mistrust. And it is upon such exceptions that a general rule is established, that the advantages of hot countries are proclaimed in the treatment of pulmonary phthisis. Is not the opposite conclusion rather the strict expression of the facts? Is it not more true to say that, viewed in their aggregate, hot countries accelerate the course of phthisis, instead of retarding it."

"There are, however, on the confines of these regions, some isolated points which owe to purely local circumstances the possession of an uniform temperature, and of a warm atmosphere, presenting to phthisical patients a combination of circumstances favourable for the occasional prolongation of their

existence, and in all cases to alleviate its termination; without our being able to say that the progress of tuberculization has been suspended.

M. Rochard, like some other physicians who have written on the influence of climate in pulmonary tuberculization, speaks of the disease only in general terms, without taking into consideration the varied effects to which it gives rise, acting upon individuals of different constitutions, according to the causes which may have produced it, its rapid or slow progress, and other circumstances which determine that a kind of climate suitable to one case would be prejudicial to another of the same disease. Thus, for several of these patients, Madeira, which is placed by M. Rochard in the first line, might not be at all suitable, whereas the same patients might possibly derive a greater or less degree of advantage from a residence in the south of Spain—as at Malaga, which is not comprised in M. Rochard's enumeration of good climates—or of some other places, the meteorological conditions of which differ materially from those of Madeira. Hyères, Venice, and Pisa, which are placed in the second category, and on the same footing, are under very different and even opposite conditions as respects climate. Hyères, for instance, has a warm and dry climate: rain falls only on 40 or 50 days in the year; whereas Pisa is proverbial for being the most rainy city in Italy. Venice, again, is not sheltered from winds, and its temperature is much lower than that of the other towns frequented by pul-

monary patients; it likewise rains a good deal there in winter. Thus, patients who might find themselves benefited by a winter's residence at Hyères, would often be likely to derive no advantage—even if their condition did not become aggravated—from that of Pisa and Venice, and *vice versâ*. Rome and Nice, which M. Rochard places in the third category, are even yet more opposed than the preceding towns as regards the peculiarities of their climates, as well as in other respects. The air of Nice is warm, dry, and exciting, whereas that of Rome is somewhat moist and relaxing; the indications for the residence of consumptive patients, in the one or other of these localities, would consequently be very different. The localities comprised in the fourth category likewise present very marked differences, which would prevent them from fulfilling the same indications. Egypt and Algeria would suit many patients, to whom Menton would not be adapted. As to the other places mentioned —Villefranche, the Bay of Spezzia, the shores of the Lake of Como—they have not accommodations for the reception of invalids, and possess no resources. The climate of the last-named would be positively detrimental in winter to delicate patients.

Those who are under favourable conditions for being cured, or obtaining durable amelioration, should not always resort to those localities which "enjoy an uniform temperature, and a warm atmosphere exempt from perturbations," a too prolonged sojourn in which would tend to enervate their con-

stitutions, and to render them extremely susceptible to the atmospherical variations which they would meet with elsewhere. On the contrary, many of these patients would find themselves better, and would make progress towards recovery by passing the winter months in places where the air is not so warm, and is more agitated and bracing, and even by the constant change of air, as in sea voyages, which are often beneficial when undertaken in suitable seasons and directions. The cases being properly discriminated, a directly opposite conclusion may be deduced than that expressed by M. Rochard, viz., that "sea voyages accelerate the progress of pulmonary tuberculization." This physician, who, it would appear, has not a personal knowledge of those places which are most frequented by patients, and who, from his position, has not had opportunities of judging of the effects produced by the residence of patients in these places, draws the conclusions at which he arrives from too exclusive premises of the facts which he has been enabled to observe, and from the reports of the mortality from phthisis among individuals placed under conditions the most favourable for giving rise to, and for accelerating the progress of the disease—viz., those who have been in service in ships of war, or in the colonies in tropical regions.

The frequentation during several years of places resorted to on account of climate, a knowledge of the opinions of the local physicians, as well as of others who have written on the subject, and the

relations which I have had with patients and persons who have sojourned there for longer or shorter periods, have strengthened my belief, in accordance with the views exposed in my memoir, that we may hope to obtain a cure in many cases of phthisis from the influence of climate, if recourse be had to this means at a sufficiently early period, aided by a suitable medication and regimen; and that if the use of this remedy has not been followed by more favourable results up to the present time, the circumstance is attributable, in great measure, to the causes which I have already specified.

The following observations by M. Boudin, in his recently published work, altogether disprove the arguments and conclusions of M. Rochard respecting the effect of sea voyages in cases of pulmonary phthisis.

He quotes the ensuing passages—the former from the statistical report of the health of the navy (vol. ii.); the latter from a memoir read by Colonel Tulloch before the Statistical Society of London.

"These reports establish the important fact that sea-life has a sanatory influence on non-inflammatory affections of the lungs—at least, on the most destructive of them, the phthisical."

"There seems little doubt that either the sea-air or the excitement produced by the voyage does sometimes operate very materially in alleviating the symptoms of phthisis. Many soldiers sent home from Malta with the apparent symptoms of confirmed phthisis, have arrived in this country in

renovated health, and have speedily returned to their duty. The proportion of deaths of those labouring under consumption is remarkably low on ship-board."

"Simple catarrh," he adds, "which is now called bronchitis, is much less frequent in the army than in the naval service—in other words, the sailor catches cold much oftener than the soldier; but, on the other hand, phthisis is incomparably more common and fatal among soldiers than among sailors. The proportion of deaths from phthisis, which amounts to 4.09 in 1000 men among the former, is among the latter only from 1.79 to 1.09, including the deaths from hæmoptysis.

"It may be said that phthisis is less frequent in other armies than in the British, and that the disease may be more frequent in some armies than in the British navy. In the United States' army the proportion of deaths from phthisis in 1000 men is 3.5. In the Prussian army it is 3.1; but the Prussian soldier only serves from 20 to 25 years. It must be evident that the figure given by M. Benoiston de Chateauneuf, with respect to the mortality from this disease in the French army, is greatly below the reality. We may believe that the proportion is at least 4 in every 1000 men. At the Hôpital du Roule, four years of observation have exhibited 152 deaths from phthisis, on 1073 deaths from various causes (excluding cholera), or 1 on 7.06. But in every well-organized medical service, the great majority of tuberculous patients

are not retained, having leave of absence to go to their homes. The facts being known, reasoning authorizes us to conclude—1. That phthisis is much less destructive in the navy than in armies; 2. That if the *curative* action of a sea residence remains undetermined, its *preventive* action is, at the present time, incontestable.

Doubtless, this proposition is in direct opposition to the conclusion at which M. Rochard has arrived in his recently published memoir. But our proposition rests, as we have seen, upon the most palpable evidence of conclusive facts. This difference in the appreciation of this remedial means requires that we should examine separately each of the conclusions of the work in question.

"1st Conclusion.—Sea voyages," says M. Rochard, "accelerate the course of tuberculization much more frequently than they retard it." This proposition is, perhaps, wanting in an experimental basis, scientifically established. "2nd Conclusion.—Phthisis is much more frequent among sailors than among soldiers." The numerous documents which we have quoted prove precisely the contrary. "3rd Conclusion.—Phthisis progresses with greater rapidity on board ship than on land." This proposition appears to us to be likewise deficient in scientific demonstration. "4th Conclusion.—The navy ought to be interdicted, as a profession, to young men threatened with phthisis." It is not shown that consumptive subjects, *in an early stage of the disease,* who have gone to sea in order to

occupy themselves only about their health, have had reason to regret it."[1]

Dr. Knox ascribes the advantages derived from sea voyages, in consumption, to the equability of the atmosphere at sea. "Through a voyage from England to Africa," he observes, "the progressive change experienced each noonday averaged only 1°. The temperature of the air on leaving England was 53°; on arrival, 73°; that of the sea on our coast, 49°; on the African, 71°;—in like manner advancing progressively from 1° to 2° as we proceeded southwards."[2]

On the other hand, the author of a recently published work thinks it not unlikely that the benefit frequently obtained by patients from sea voyages and a residence on the coast, is attributable to the diminished amount of oxygen in the sea atmosphere, owing to its greater absorption by sea water, which contains as much as 36 per cent of this gas,[3] and are, however, more inclined to ascribe the advantage to the causes already specified.

[1] Geographie Médicale, 1856.
[2] Edinburgh Philosophical Journal.
[3] Dr. Spiess, Pathologische Physiologie, Frankfort, 1857.

2. ADVANTAGES OF ELEVATED OVER LOW AND MOIST LOCALITIES.

Dr. Lombard—"Des Climats de la Montagne considérés au Point de Vue Medical."—("Annales des Sciences Physiques et Naturelles," August, 1853.)

Fuchs (Medicinische Geographie) concludes, from his statistical data, that phthisis is infrequent in proportion to the elevation of the ground. No mention is made of phthisis among the diseases of persons who live in the highest parts of the Alps—the St. Bernard, the Grande Chartreuse. At Briançon, some exceptional cases occur, produced by destitution, &c. Nothing equals the frequency of pulmonary phthisis in most of the Alpine valleys. Most of the facts establishing the rarity of chest diseases in elevated localities have been observed in the highest regions of Peru and the High Alps, whilst other observations almost all bear upon mountainous localities, it is true, but situated at inconsiderable elevations—the English towns referred to by Mansford;[1] the hills and mountains surrounding the Lake of Zurich, and the valleys of

[1] "Inquiry into the Influence of Situation on Pulmonary Consumption," 1818. This author advanced the opinion that consumptive patients were more frequently met with in proportion to the elevation of their habitations above the level of the sea.

the Jura. M. Lombard agrees with M. Lebert in the opinion that the inhabitants of the mountainous regions of Switzerland are more frequently attacked by scrofula—as those living on the acclivities of the Jura, or of the Alpine regions of Savoy.

Dr. Archibald Smith—"On the Influence of the Climate of Peru on Pulmonary Consumption."—("Medico-Chirurgical Review," October, 1856.)

In the warm and moist climate of Lima (situate on the sea-shore), next to fever and dysentery, phthisis is the most fatal disease, the proportion being about 3 deaths in 17 from all diseases. On the coast generally, the most usual exciting cause of pulmonary affections is observed to be some check to the perspiration, especially in spring. When the frame becomes much debilitated, and especially when the patient is convalescing from some prior ailment, it is a familiar event that, under such circumstances, incipient phthisis presents itself.

It is a popular maxim in Peru, that a change from the coast to the mountain climates, graduated as the case may require, will do more to restore health than all the drugs within their ken; and if this easy migration be too long deferred, confirmed as well as hopeless phthisis will be the end of disorders so initiated on the coast.

I have witnessed the application of all European remedies of every school, fully tried, when the

phthisical patient was, for one reason or another, destined to run his course on the coast and in the capital, under the eye of able assistants, but always with the same fatal termination.

The change from the climate of Lima, or the coast, to that of the mountain slopes (at moderate elevations relative to the snow-line), has been known to prolong life for years, and allow the patient, with renewed strength, to return from time to time to the coast, with marked improvement in general health, as well as in the condition of the lungs, and quite free from fever. By proceeding inland to the Valley of Janja, at an elevation of 10,000 feet above the sea, such incipient phthisical cases, especially the hæmoptoic type, are always relieved, and almost always cured, provided the patient remain long enough to ensure this result.

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3. EFFECTS OF A MOIST AND OF A DRY AIR ON THE ECONOMY.

Dr. Gintrac—"Pathologie Médicale."

A humid air, whether warm or cold, produces a debilitating impression. The external absorption introduces into the vessels a great quantity of water; the cutaneous perspiration does not restore an equal quantity to the air, which is saturated with moisture. The mucous membranes secrete

more or less, but speedily fall into a state of atony. Digestion languishes; the pulse is soft; the muscular system enervated. A dry air is, on the contrary, stimulating; if it be at the same time warm, its first impression re-awakens the whole organism. The movements and sensibility are excited; the pulse becomes accelerated; the blood acquires a redder colour; the secretions, especially those of the skin, are increased. But *if the heat and dryness are continued,* the strength diminishes, either from the relaxation consequent upon a too long tension of the fibres, or else from the considerable drain occasioned by the augmented secretions and perspirations. The stomach is weakened, the mucous membranes are irritated, the nervous system becomes excited, whilst the muscles fall into inactivity. This is what is seen in the course and at the end of summer, and in hot countries.

A dry and cold air has quite a different action. Under its moderated and continued influence, digestion is more easy, the appetite excellent, the formation of a rich and abundant blood is perfect, nutrition is active, and the muscular power increased. This modification of the air is, therefore, essentially tonic—at least, for those who have sufficient inward power to react against the first impression of cold. In very elevated places, the diminished atmospheric pressure produces rarefaction of the air, and, consequently, a diminution of the relative quantity of the oxygen supplied to the pulmonary vesicles. Hence, the breathing is ne-

cessarily accelerated; the thorax requires to expand itself, in order to admit the greatest possible dose of air. A continual residence on high mountains makes the chest assume large dimensions. From the acceleration of the respiration results that of the circulation. The cutaneous perspiration is increased, perhaps on this account, but likewise from the diminished pressure and the dryness of the air. Considerable thirst results; the sensibility is increased, and, consequently, the cooling of the air and the burning heat of the sun are more vividly experienced. There will be great disposition to action, but fatigue soon comes on. Life is shortened by living in very elevated situations. The lessened atmospheric pressure favours the production of sanguineous congestions, hœmorrhages, and often produces fainting.

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4. ON THE ABSENCE OF PHTHISIS IN THE RAREFIED AIR OF ELEVATED REGIONS.

Dr. Muhry, of Göttingen, has added an Appendix to his work, "Die Geographischen Verhältnisse der Krankheiten," on this subject, containing the following important observations, the result of much research.

"There are certain areolæ in all zones where pulmonary consumption is rarely met with, or is

altogether unknown. Even in certain localities of the frigid zone, phthisis is of rare occurrence, as in Iceland, and the Feroe Islands; but, generally, it is not infrequent in this zone. It is very common in Finland and Archangel, and was mentioned by the missionary, Cranz (1770), among the prevalent diseases of Greenland. In the temperate zone, phthisis is extremely prevalent, both in the northern and southern parts. But, even here, certain localities present an immunity more or less complete. It is rare in Algeria, especially among the Arabs and among the French troops (authorities, Drs. Guyon, Dubeyne, Haspal).

"It is seldom met with in Egypt, except among the negroes, who come from the hotter regions of Abyssinia and Nubia (Hammond, 'L'Egypte sous Mehemet Ali,' 1842; Clot Bey. Greisinger, 'Ueber die Krankheiten von Egypten, Arch. f. physiolog. Hielk.' 1853-4). The disease is, however, said to be not infrequent in Abyssinia and Nubia (Brocchi and Lefèvre), which circumstance proves that the exemption in Egypt is not owing merely to the warmth of the climate.

"Generally, consumption is no less frequent in the tropical zone than in the colder zone. In the West Indies, it is much more common among the troops (European) than in England. Dr. Hunter states (Annual Report of the Sick, &c., 'London Medical Gazette,' 1848), that in the island of St. Vincent the general mortality is 47 per 1000, of which the mortality from phthisis is 10 per 1000.

In England, the aggregate mortality among the troops is about 15 per 1000; that from phthisis, 5 per 1000. An American physician (Dr. Griswold), who long resided on the isthmus of Panama, states that consumption is the disease that gives rise to the greatest amount of mortality among the natives. Tschudi states that the disease is very frequent on the coast of Peru, where it is considered to be contagious. The author also quotes the statement of Dr. Archibald Smith ('Edinburgh Medical and Surgical Journal,' 1840), as to its frequency in Lima.

"According to Sigaud ('Du Climat, etc., du Brésil,' 1843), phthisis is as common in the Brazils as in Europe, and in the coast-towns it constitutes three-fifths of the whole mortality. In Senegambia (Africa), consumption ranks among the most common diseases. In Senegal, on the other hand, it appears to be rarely met with (Thouvenel, 'Des Maladies des Européens dans les Pays Chauds,' 1840). On the western coast of Africa, Nubia, phthisis prevails, and it is looked upon as contagious, which is a proof of its frequency. In Abyssinia, it is not unfrequent (Lefèvre, 'Voyage,' &c., 1845), though a distinction must be made between the coasts and the higher lands, as respects its frequency. On the other hand, the East Indies present a considerable immunity from phthisis. In Madras, the native troops are in the highest degree exempt, the European troops less so. This exemption holds good for the coast as well as for the

high lands (Balfour, 1846. Allan Webb, 'Pathologica Indica.')

"The disease is very rare in the Fidschi Islands (South Sea), according to Wilkes (United States' Exploring Expedition, 1845).

"In the temperate zone of the southern hemisphere, which is so remarkable for its general salubrity, phthisis is nevertheless of very frequent occurrence, with the exception of the Cape, where it is rarely seen; whereas at Port Natal, at no great distance, it is very prevalent among the Hottentots—less so among the Caffres (Black, 'Edinburgh Medical Journal,' 1853)."

The author adverts to the opinion that phthisis probably diminishes in frequency in proportion to the greater elevation of places, observing that the question scarcely admits of solution, as respects Europe, where there are but few habitable localities at a considerable elevation, or above 2000 feet. It is otherwise in the torrid zone. Independently of the mountain localities, the whole interior of Mexico forms an extensive table-land, between 6000 and 7000 feet high. The relative elevation is still greater in the regions of the Cordilleras—in New Granada, Peru, and Bolivia, where are many populous towns and villages, and some smaller ones, at an elevation of more than 13,000 feet.

"The highest lands in Europe are Switzerland, Savoy, and the Tyrol. The plains, however, in the canton of Berne are only 1800 feet high, and other plains in Suabia, Bavaria, the Harz, Bohemia,

Carynthia, &c., are at a like moderate elevation. In England, there is scarcely a place of any note at an elevation of more than 500 feet. In France, the highest plain, that of Auvergne, is only 2200 feet high. Here and there are some small places at greater elevations. Thus, Briançon, on the frontier of Savoy, is 4000 feet high, with a population of 2000 inhabitants; the valleys of the Engaddin and Davos in Switzerland—the former at an elevation of 5500 feet, with a population of 10,000 inhabitants; several isolated villages on the Pyrenees, and on the Apennines, Ætna, the Great St. Bernard (7670).

"In the temperate zone, there are evidences that phthisis diminishes in frequency even in the lower elevations, which tend to confirm the law. It is infrequent in the mountains of the Harz, Thuringia, and the Black Forest, at elevations of from 1800 to 2000 feet (Fuchs, "Medicinische Geographie," 1853). Experience has proved that a prolonged sojourn on the Righi, in Switzerland, is favourable to consumptive patients.

"In the tropical zone, there are many towns and villages on the elevated slopes and table-lands of the Andes chain—Cerro di Posco, Potosi (7000 feet), Mexico, Santa Fé di Bogota, Quito, Cuzco, &c. In the city of Mexico, phthisis is of rare occurrence (Newton's "Medical Topography," &c., 1845), yet catarrh and bronchitis are very common. In the accounts of various authors of the diseases prevalent at Santa Fé di Bogota (8100) and Quito

(8970), no mention is made of phthisis. Humboldt and Bonpland remark of the inhabitants of these elevated localities, that "they enjoy the best of health." In the higher regions of the Cordilleras (Peru), which are exempt from phthisis, scrofula is not uncommon in some places. [1]

The rarefied air, diminished pressure, and the absolute diminution of oxygen, are obstacles to the formation of tubercles in the lungs. This result may occur chemically from the diminished amount of acid, but it most likely depends upon the increased expansion of the thorax in the act of breathing. The thorax of the Indians who inhabit these high regions is extremely capacious; their lungs are powerfully developed; their extremities are short. This configuration is less apparent at the lower elevations, and still less so on the coast."

Dr. M. adverts likewise to the fact that the deposition of tubercle takes place most readily, and often exclusively, at the summit of the lungs, where their texture is the least expansive. He remarks that the diminished moisture of the air cannot be admitted as a cause of the infrequency of phthisis,

[1] "Scrofula is not met with in the Polar zone. A geographical co-existence of scrofula with tuberculosis is often apparent, though these diseases sometimes prevail separately. For instance, both are frequent in the West Indies, whereas in the East Indies both are of rarer occurrence. But in Egypt, phthisis is rare, scrofula very common. The same may be said of Palestine. In the Polar zone, phthisis exists."—Geog. Verhältnisse der Krankheiten, 1854.

as in Egypt the air is dry, whereas in the East Indies it is very moist, yet in both places phthisis is of rare occurrence. In Chili, however, the air is dry, but phthisis is a common disease.

I cannot concur in this latter observation, which appears to me to be based upon very insufficient data. Thus, more recent accounts from the East Indies state—in opposition to those furnished many years ago by Balfour, Webb, and others—that phthisis is very prevalent in some parts of this country where the air is moist—in the Presidency of Bengal, for instance, and particularly in Calcutta. In Chili, there are close and damp, as well as light, dry atmospheres, and accurate statistic data would doubtless show the same results as respects the frequency of phthisis in the former, and its comparative infrequency in the latter. I have endeavoured to show that, not only in mountainous districts, but in plain countries, and even in towns, there is a greater exemption from the disease where the air is dry, whether from the absence of rain, or from the prevalence of winds. The islands, in perfectly opposite zones, the Feroe and the Fidschi, referred to by Dr. Muhry as being exempt from consumption, agree in the circumstance of the air being dry, both being freely exposed to the action of the winds.

Without under-estimating the part which may be ascribed to living in the rarefied air of high regions in procuring an exemption from phthisis, I yet think that Dr. Muhry is disposed to attribute too great a share to this agency. In several locali-

ties, but little elevated above the sea, but where the air is dry, and even in places on the same level, phthisis is of comparatively rare occurrence, or if it do occur, it is mainly restricted to certain classes, and is occasioned more by anti-hygienic influences than by the climate. Dr. Muhry, in estimating the action of a rarefied (and the same ensues from a dry, even if not rarefied) air, does not advert to its effects upon the skin, and the increase of the insensible perspiration to which it gives rise; yet this is a no less important element in producing the result in question, than the introduction of an increased volume of air in the lungs; and I have shown that, even in places having a moist atmosphere, where consumption is generally prevalent, certain classes, by active out-door occupations, by which the cutaneous functions are kept in a healthy state, and the amount of insensible perspiration is increased, are almost completely exempted from the disease.

I find that the preceding observations, as well as some of the opinions I have expressed in this essay, are corroborated by the authority of Dr. Copland, who, in his "Dictionary," remarks, with reference to the causes: "Hereditary predisposition is fully admitted, but the other remote and predisposing causes, which appertain especially to the parent or parents, and influence the organization of the offspring, are insufficiently recognized. The predisposition also, which is generated by the more direct causes which depress the vital energy by the re-

moval of agents to which the frame has been habituated, or which are necessary to health, and by the action of other agencies which are either obscure or concealed, are often overlooked, or not known; and thus the advantages connected with their prevention and removal are altogether lost. Hence, these *causes* being unknown or unsuspected, their *effects* cannot be prevented, and the means necessary for the removal of the former, or the cure of the latter, are either altogether neglected, or employed accidentally, empirically, and often inappropriately.

"*Climate.*—Climate and weather, aided by various circumstances, very remarkably influence the first stage, especially when aided by judicious treatment. With the advance of spring and summer, in this and temperate countries, the malady often appears arrested, and the general health improved.

"As to the climate of different countries, and as to the influence of situations and locality, either as favouring or in preventing the prevalence of phthisis, our knowledge is altogether imperfect. Much that has been asserted on this subject is more or less inaccurate, the inaccuracy being often in proportion to the dogmatism with which the matter is treated.

"Several writers have asserted that pulmonary diseases, and more especially consumption, are rare within the tropics, and in the natives of these countries particularly; but Dr. Webb states that the 'records of cases of natives in *every part* of India,

show that phthisis and pulmonary affections are, at least, not uncommon diseases among the natives of India, and only yield in frequency to fever, cholera, and dysentery; presenting that form and variety that is to be met with in any other part of the world.' Dr. Green states that pulmonary consumption is a prevalent disease in the lower provinces of Bengal, and Dr. Webb remarks, that he himself observed the disease extensively among the Hindoo race, and in the Paharies inhabiting the lower belt of the Himalaya range of mountains. The same writer refers to Dr. Goodeve's report of the prevalence of pulmonary disease in Upper India, wherein he states, 'tubercular phthisis we have abundance of, as the detailed autopsies forwarded every month show.' ('Pathologica Indica.')

"In other parts of South America (besides Peru)," adds Dr. Copland, "the occurrence of phthisis appears to be infrequent, especially among the unmixed dark races. In Mexico, the disease is said to be rare. According to Dr. Hancock, phthisis is almost unknown on the coast of British Guinea, and very rare in the mountains. Colonel Tulloch states that, at St. Helena, the mortality of the population from diseases of the lungs is about 3.2 per 1000 annually." (Among negro children of the west coast of Africa, Dr. Copland remarked that mesenteric disease was not uncommon.)

"After considering the distribution of heat over the globe, as displayed by the isothermal lines of Humboldt, and by the later researches and illustra-

tions of Professor Dove, I infer that less is owing to temperature than to race and modes of life, in the causation of phthisis. Coldness and humidity of the air, low elevations from the surface of the ocean, sudden and frequent vicissitudes of temperature and weather, are among the most influential elements of a climate which favours the production of this malady, whilst a moderately warm and dry atmosphere, considerable elevation above the sea, especially in warm countries, and regularity of season and temperature and weather, generally diminish the prevalence of the disease, and favour recovery in its early stage."

According to a writer in the "British and Foreign Review," the disease is rare in Denmark, and still rarer in Norway, Lapland, Iceland, and the Feroe Isles. In Canada, notwithstanding the severity of the winters, and sudden alterations of temperature, *the air being dry*, tubercular maladies, and especially phthisis, are comparatively rare. In Russia this disease is much less prevalent than in the southern countries of Europe; though both Sir A. Crichton and Sir G. Lefevre state that external scrofula is very prevalent, especially at St. Petersburg and Moscow. In the southern temperate zone, between the isothermal lines of 40° and 70°, comprising the southern part of South America, the Cape of Good Hope, with a portion of South Africa, nearly the whole of Australia, Van Diemen's Land, and New Zealand, all accounts lead to the conclusion that tuberculosis is much less frequent than in

countries situate to the north of the northern tropic. This comparative immunity is owing to the remarkably less liability of the native races to the disease, and to the *general dryness of the air,* notwithstanding the sudden vicissitudes of temperature, other conditions either not known or imperfectly appreciated may also concur to produce this result. The immunity of the natives of the countries to the north of the temperate zone from phthisis, is mainly attributable to their *active avocations in the open air,* to the nature of their food, and its adaptation to the temperature and climate to the *general dryness of the air,* to the *warmness of their clothing, whereby the skin preserves its depurative functions,* and to the warmth of their sleeping places. The immunity, or comparative immunity of the dark races from phthisis, while they reside in their native countries, is chiefly to be attributed to their *out-door modes of living and exercises,* to the adaptation of their food to a high range of temperature, to the influence of miasmatous districts in counteracting the tendency to tubercular consumption,[1] as also in no small measure to *the increased functions of the skin* in these races; these functions being in them *more decidedly than those of the lungs and liver more actively depurative of the blood* than in the white race.

"From what I can learn tubercular phthisis is not

[1] This opinion is completely disproved by the results of extensive observation.

a prevalent disease among the Chinese, at least as long as they remain in their native climates, and pursue their usual occupations, habits and modes of living.

"In all races the clothing, and in the dark races the inunctions of the skin, in addition to the slight clothing required by the vicissitudes of season and weather, tend to promote the regular discharge of the cutaneous functions; the fair skinned races of Europe and America being those in which these functions are least active in health, and most liable to interruption.

"*Treatment.*—If we except the recent employment of cod-liver oil in phthisis, in what, it may be asked, has the treatment of this disease been advanced since the appearance of the works of Bennet, by the voluminous writings of specialists and stethoscopists in recent times?

"Sydenham recommends very strongly horse exercise, and he states that riding cures consumption, as certainly as bark cures intermittents.[1] He also praises carriage exercise.

"Morton considers chalybeate waters as preferable to all other means for the prevention of consump-

[1] "Until the commencement of the nineteenth century, the subacute and chronic forms of bronchitis were very generally described and treated as forms of consumption, and even of true tubercular phthisis; and this want of precision in the diagnosis led not only to a much greater diversity of opinion as to their treatment, but also to a marked difference in the reputed results of the means employed."

tion, especially in scrofulous constitutions. Stahl considers exercise on horseback, or in a carriage to be the most beneficial remedy in phthisis. Fuller agrees with Stahl as to riding on horseback being most salutary in this disease, when without fever. Gilchrist adduces numerous cases, showing the advantage of sea voyages. Van Sweeten advocates horse exercise. Reid recommended ipecacuanha emetics morning and evening, and considered sea-voyaging beneficial, mainly by producing nausea and vomiting.[1]

"Dr. Duncan, on the other hand, believes that voyages are counter-indicated by the inconveniences and risks attending them. As I have already remarked, this question of sea-voyages is to be determined only by reference to the peculiarities of individual cases, tastes, duration of the voyage, &c.

"The great principle of treatment in this stage, as well as when the disease is merely threatened, is to develope the powers, and increase the vital resistance to the further advance of the malady without producing or augmenting febrile symptoms —by hygienic means, and medical treatment.

"A winter residence should be selected which will admit of *regular and daily exercise in the open air;* voyaging, if commenced in the first stage or before the second be far advanced, especially in

[1] Dr. Bricheteau, of Paris, in his work on Pulmonary Diseases, strongly advocates emetics, and considers the sickness produced at sea to be principally instrumental in producing the advantages derived from them.

cases which have been attended by hemoptysis at their commencement is advantageous; and repeated voyages, so as to avoid the winter and spring of this and other countries favourable to consumption."

These observations directly corroborate the opinions which I have expressed, as respects the action of a dry air in the prevention and remedying pulmonary consumption, in great part by the effects produced upon the skin, and in increasing the amount of insensible perspiration, by which means the retention of noxious matters in the system which tend to vitiate the blood, and to occasion the formation of tubercle is prevented. Residence in a dry air whether on plains, on mountains, on the sea shore; in the tropical or in the frigid zone; is found to procure an exemption to the inhabitants from phthisis, and frequently to remedy the disease when in an early stage and capable of being remedied.

Active occupation in the open air, horse exercise, sea voyages, act in like manner by renewing the air around the body, causing dilatation of the thorax, a freer circulation, and more perfect formation of blood, together with the elimination of noxious matters by an increased activity of the cutaneous function; whereas agencies of an opposite character which tend to impede the free circulation of blood through the capillary vessels, and the respiratory action, and consequently the activity of the cutaneous functions—sedentary habits, depressing passions, a cold or a warm moist air, &c., are, as I

have endeavoured to shew, the most influential causes in the production of the disease, which require to be counteracted by efficient hygienic and medical treatment.

The following brief remarks on this subject by eminent foreign physicians may be appropriately introduced in this place.

Dr. Gintrac observes, with reference to the treatment of scrofula; "one of the first means is a pure air. A residence in southern countries for the inhabitants of the north produces this beneficial result, by *rendering the functions of the skin more active*, and obtaining a useful depurative effect."

Travelling on the mountains or on the sea-shore, which exposes the body to an active ventilation, and to sudden chills, (*refroidissements*), would seem to be prejudicial; they are, however, advantageous. Nothing is more useful in chronic diseases than to break the monotony of impressions; a mountain air is beneficial to the health of one not accustomed to it. It is the same as respects a removal to the sea-shore. It is the change of air that does the good.[1]

Dr. Swett, physician to the New York Hospital, in his lectures on Diseases of the Chest, (1852), doubts the assertions of Lombard that constant exposure to a watery vapour exerts a beneficial influence, and that a warm dry atmosphere exerts an unfavourable influence in consumption. (Here again it is a question to be determined only by the

[1] Cours de Pathologie Interne, 1853.

indications presented in individual cases—in some a warm moist atmosphere would be beneficial, and a dry atmosphere hurtful, and *vice versa*).

"The opinion, says Dr. S., that residence in a malarious region is favourable to phthisical patients is the reverse of the truth. At the inland posts of New England where phthisis is the most rare, malarious diseases are also the least frequent, while at the south-western posts, and at those from Delaware Bay to Savannah, where phthisis is most prevalent, malarious diseases are also most prevalent. But in Florida, this ratio is not observed. In this region phthisis occupies a medium place, while the ratio of malaria disease is high; the reverse of this is found to exist at the posts of the great lakes.

"In those regions where phthisis is most prevalent, there inflammatory diseases (if a cause) ought also to be most prevalent, but it is not so. They are different entirely from the malarious diseases in their ratio to phthisis. Thus, according to Dr. Forry's reports, bronchitis is most prevalent in those posts remote from the ocean and the lakes, precisely where the ratio of phthisis is at the least. The British reports confirm the conclusions of Dr. Forry, and it is a striking fact, that while phthisis is comparatively rare among sailors, bronchitis is twice as frequent as in the army.

"Those who maintain the opinion that imperfect digestion, and the mal-assimilation of the food, is a leading cause of the tubercular deposit, have failed, I think, to establish the fact. The symptoms of

dyspepsia, although they may precede and attend the early development of the disease, are by no means of very frequent occurrence. You will constantly meet with cases in which the digestive powers possess the average degree of healthy action, until in the progress of the case they begin to fail from the general weakness which the disease produces. This is what you must expect, in all chronic diseases, especially those in which debility is a prominent symptom.

"There is always more or less anemia in phthisis, which the use of iron tends to counteract. It is often highly beneficial, especially in chronic phthisis.

Dr. S. ascribes the great mortality from the disease in the West Indies, and along the southern shore of the Atlantic to the "prevalence of malarious diseases, which by deteriorating the constitution, open the way to the deposit and to the development of tubercles in the lungs." The heat and moisture of the atmosphere in many places where there is no malaria, but where phthisis is prevalent, by enervating the constitution suffice to account for the circumstance.

"The English government are now in the habit of sending phthisical patients from their military posts in the West Indies to Canada, and it is said with advantage. We are beginning not to dread the influence of a dry cold climate upon this disease. I have found by experience that the dry cold weather of our early winter often agrees very well

with this class of patients, and I have learned from it not to recommend a too early departure for the south.[1]

Upon the Influence of Marshy Localities on Phthisis.

Many persons died from phthisis, who had always lived in the environs of La Rochelle—which are very marshy—where fevers are endemic throughout the year, and who had suffered from attacks of intermittents. Dr. Schedel has verified that there are numerous consumptive patients at Antwerp, Rotterdam, in Walcheren, where, however, the marshy condition of the localities, and the endemic character of the intermittent fevers exist in a very great degree.

If fewer consumptive patients are met with in marshy neighbourhoods, it is because the fevers which attack these patients as well as the other inhabitants of the district, exercising a pernicious influence upon them, they are naturally induced to go away, chiefly just at the period at which the epidemic is most prevalent. M. Lefèvre judiciously observes that if the army in Africa presents so small a number of consumptive subjects, the circumstance depends, not upon the favourable in-

[1] This remark is not applicable to all cases. Some patie ts feel the influence of cold to be unfavourable, especially th se who have not been accustomed to exercise in the open air.

fluence of the miasma of the formidable marshes of that country, but upon various other reasons. The army is recruited from the most healthy men, who before embarking for Africa are reviewed by the sanitary board, when the unhealthy, or those threatened with phthisis, necessarily remain in France; and when this disease shows itself among some soldiers in Africa, they are sent back to France invalided.

At the Naval Hospital in Rochefort, phthisis furnishes a third of the whole mortality, out of 179 deaths among free men, soldiers, and sailors, there were 34 cases of phthisis, or one-fifth of the whole. Of 65 deaths among those condemned to hard labour, 12 were occasioned by the same disease.[1]

M. Rochard remarks on the same subject (*op. cit.*) "Intermittent fevers are very common in the Brazils, and have increased in intensity within the last few years. The whole pathology of the country is stamped with their impress. It appears that consumptive patients derive no advantage from a residence in marshy districts. Those sent by M. Sigaud to Lagoa and other malarious localities were not benefited by their removal.

Guinea is a flat country covered with marshes, and subject during six months of the year to diluvial rains. The temperature ranges between 24

[1] Report of a Committee of the Académie Impériale de Médecine, on a communication from Dr. Lefèvre, Professor of the School of Medicine at Rochefort.

and 28 degrees: endemic fevers constitute the basis of the pathology, acute diseases of the respiratory organs are not infrequent. Notwithstanding the high temperature of Guinea and Cayenne, pulmonary phthisis is tolerably common, though of less frequent occurrence than in France. In the West Indies, (Martinique, Guadeloupe), the towns are all situate on the coast: the diurnal variations of temperature sometimes extend to 10 degrees from the morning to the evening. The humidity is greater in the Antilles than in Europe; torrential rains prevail during the winter season. There is, perhaps, no other country, on a level with the sea, where there falls so much rain.

Two kinds of diseases predominate in the Antilles, marsh fevers and abdominal affections. Phthisis occupies the fourth rank, and is prevalent at the same time as intermittents and typhoid fever.

"The exclusion of one of these diseases by the other, which has been supposed to occur, says a recent writer, is only apparent; for, as Virchow has rightly observed, everything depends upon the circumstance, whether in individual cases, the conditions which give rise to tubercle, exist in the *localities* which *produce* intermittents or not. In fact, extensive experience has demonstrated that, besides the districts and towns where, as in Algeria, marsh-fevers prevail, while tuberculous diseases are scarcely met with, and those in which tuberculous diseases are common, but which are exempt from marsh-fevers, there are, on the other hand, many populous towns,

both in the temperate and hot latitudes, in which both these diseases are very prevalent at the same time, and, moreover, that there are, especially in tropical countries, elevated districts in which the population is equally exempted from both."[1]

With respect to the frequent instability of the amelioration obtained in cases of phthisis in the West Indies—M. Levacher remarks: "Notwithstanding these advantages which are only temporary, and which only last during the first years, it is necessary for us to be on our guard against these apparent cures, for when some individuals, after becoming acclimated, are already convinced of their cure, it may happen that from any cause, indolent tubercles may become inflamed, suppurate, and occasion death which nothing seemed to presage. In the West Indies, as in all the colonies, phthisis is more common and more fatal among the blacks and mulattoes than among the whites."—*Guide Médical aux Antilles.*

[1] Dr. Spiess. Pathologische Physiologie. Frankfort, 1857.

NOTICES

OF

SOME OF THE MOST FREQUENTED PLACES OF WINTER RESORT.

It is often difficult for the physician residing at a distance to form a just estimate of the advantages or disadvantages of the climates of particular localities, on account of the partial statements published respecting several of them, by persons who may be actuated by interested motives, or who may not have had sufficient opportunities of comparing the places of their predilections with others, perhaps, equally if not more favourably circumstanced as residences for invalids. Having had considerable opportunities of investigating the peculiarities of many of the places of winter resort, I have endeavoured in other publications to present an impartial view of their respective general applicability to diseased conditions of the system; and, on the present occasion have contented myself with briefly specifying some of their leading features, referring to the works for more detailed accounts of their

meteorological and climatic characteristics.[1] As respects some places beyond Europe, which I have not visited, (Madeira, Algiers, Egypt), I have in the following notices availed myself of the details furnished by the most recent authorities, and of the information which I have derived from invalids, or their friends.

PAU.

Pau presents many advantages as a winter residence for several invalids, being situate near the mineral springs of the Pyrenees, where there are always in the summer a great many persons whose state of health requires later in the season the beneficial influence of a mild climate. It is easy of access from the more northern parts of France by means of railroad communication with Paris—brought within a six hours' drive. Occupying part of an elevated plateau, which overlooks a picturesque valley fertilized by the Gave, or mountain river of the same name, Pau consists principally of a long street terminating near the old castle—celebrated for its historical associations—of short divergent streets, and two Places, of which the one (Henri IV.) is very large, the houses being built on colonnades; the other (Royale) has only houses on

[1] My "Companion to the Continent" contains sketches of most of the places frequented by invalids in France and Italy, with general remarks on the influence of climate and travelling.

three sides, the fourth forming a terrace facing the south, whence a rich and varied panorama is displayed to the view, encased towards the south by the lofty chain of the Pyrenees, and on the south-west by the verdant slopes of Jurançon. The town is lighted with gas; it possesses a public library, a *cercle* where the principal French and English papers are received, libraries for the loan of books, and a theatre. There is an agreeable, though not *bruyante* society in the winter season. The population amounts to about 14,000 souls. A park, well sheltered by lofty trees, extends from the chateau to the distance of half a league parallel with the valley, and at a considerable elevation above it. The environs are extremely interesting, and the roads are maintained in a good state. Riding is very general among the visitors.

A prolonged sojourn at Pau would, however, not unfrequently have a depressing effect upon persons out of health, and unable to take part in the pleasures of society, as, except the salons of the *cercle,* there is no place of *réunion* in the evening, or for exercise in bad weather, and it rains a good deal at Pau; so that persons in health, and more especially invalids, are often deprived of the resource of outdoor exercise, and are obliged to confine themselves to their apartments.

The climate of Pau is relatively mild, less warm than that of Provence, but also less liable to great variations of temperature. It is milder, and, at

the same time, on account of its elevated position, and the absorbent nature of its soil, less humid than the other towns in that part of the country.[1]

HYERES.

The aspect of the greater part of Provence is rather dreary and monotonous from the comparative deficiency of trees (except the olive) and of vegetation, consequent upon the dryness of the climate. The heat in summer is almost unbearable; the roads are thick laid with dust, which, during the prevalence of winds, is raised in clouds. Though the temperature in winter, as marked by the thermometer, is not low, the air is sharp and often cold, the strong northwest wind (mistral) is not unfrequently painfully experienced, especially in January, February, and March. In spring the sun acquires great power, and its influence alternating with the occasional cold winds produces frequent and rapid changes of temperature, very trying even to those in health. The rains fall at irregular periods, last during several days or weeks, leaving a long interval of fine weather, during which the sky is bright and clear. The best seasons for residing in this part of France are from April to the middle of June, and from September to the end of November.

Hyères presents an exemption from some of the disadvantages of the general climate of Provence.

[1] For a detailed account see Dr. Taylor's work on Pau.

It is about an hour's drive from Toulon. On approaching through olive plantations and vineyards, the attention is attracted by the extensive ruins of its ancient castle and walls, crowning the hill at the base of which the town lies, and by which it is sheltered from the north. Passing in front of the large hotel Iles d'Or, the chief street, being the high road to St. Troper, is traversed. About the centre is a terrace, with five magnificent palm-trees, commanding a delightful view of the plain, with its rich and varied vegetation of olives, oranges, palms, cypresses, &c., extending to the sea, which is three or four miles distant. The islands of Hyères, about two leagues from the shore, add to the beauty of the scene. Opposite the terrace is a small library, but indifferently provided with books, and adjacent are the two other principal hotels, 'de l'Europe' and 'des Ambassadeurs.' In the former is a saloon appropriated to the *cercle*, where the leading French journals are received. At the extremity of the street is a Place of very ordinary appearance. The divergent streets are narrow and badly paved. The resident population amounts to 10,000 souls. The new hotel, Laure, is much frequented.

The climate of Hyères is well adapted to many cases of pulmonary consumption, on account of the purity and dryness of the air, which is less agitated by winds than that of places directly lying upon the sea-shore. The want of promenades and of resources, will, however, be sufficient inducements for many persons to whom this kind of climate is appli-

cable to prefer Nice. Those who seek repose, and who purpose wintering at Hyères, would be less exposed to wind if lodging near the terrace, and eastward, than at the entrance of the town.

The small town of Cannes, on the opposite side of the Estrelles (part of the maritime Alps) has been a good deal frequented of late years by those desirous of a quiet winter residence in a mild climate. It is sheltered from the mistral, though somewhat exposed to the east. It lies on the high road to Italy, and has a population of 4000 souls. The environs are agreeable, though having only lately come into notice, Cannes is very deficient in accommodation.[1]

NICE.

Nice, in the Piedmontese territory, occupies a picturesque position on the sea-shore, about a league distant from the French frontier; it possesses a population of 40,000 souls, independently of a large garrison. The greater part of the town is separated from the port by a rocky hill, rising precipitously from the sea, and surmounted by the ruins of a fort. A parapeted road, cut round the rock, at some elevation above the sea, forms the principal means of communication between the two parts. The Place Victor, a spacious square, and some new streets, lie to the north of the port; the old town

[1] For a detailed account, see my "Notices sur Hyères et Cannes." Adams, 59, Fleet Street; Galignani, Paris.

and the new streets, inhabited by visitors, to the west. The streets of the old town are lined with shops, and, with one or two exceptions, are not wide enough to allow the passage of a carriage. The Corso, a public promenade parallel with the sea and planted with trees, and the adjacent streets, contain some good houses, which are let to visitors. A long range of low buildings, consisting of shops and cafés, separates the Corso from the beach. Their flat roofs form a spacious terrace, extending from the Castle Hill to the Boulevard du Midi, which is the usual afternoon promenade. A river, or rather the dry bed of a river (the Paglion) forms the limits of the town on the west. The houses on the opposite quay are (next to those on the Boulevard du Midi) most sought after; here are the principal hotels. Beyond this quarter is the suburb of the Croix de Marbre, which extends a considerable distance westward along the high road to France, and contains several large houses, to which orange gardens leading down to the shore are attached. A promenade (Chemin des Anglais) is continued along the beach close to the garden wall.

The environs of Nice are delightful; the soil is extremely rich in vegetable productions; various kinds of flowers, the olive, pomegranate, lemon, orange, almond, and fig, grow luxuriantly. Upon the top of the Castle Hill a charming prospect is presented of Nice, with its numerous villas, gardens, orange plantations and olive-clad hills, its beautiful bay, and the lofty mountains which shelter

it from the north, and to which it owes its advantages of climate; while immediately beneath, the houses of the old town, thickly clustered together, contrast strikingly with the beauties of the surrounding scenery.

Nice presents a good many resources for occupation and amusement. There is a cercle with a good library and reading-rooms (the principal French, English, and Italian papers being received), rooms for cards, &c., and concerts; two good libraries, with reading rooms, Visconti's establishment, two good-sized theatres, where Italian operas and French dramas are performed. The Church of England service is conducted by a resident clergyman, before a generally numerous congregation. Excursions are frequently made on donkey or horseback among the hills and valleys of the neighbourhood, and to more distant points, among which may be particularly specified, Villefranche, which is separated from Nice by a steep hill. This little town is almost surrounded by olive-covered hills, and being sheltered from all cold winds, its climate is warm and equable. It possesses a spacious harbour which can admit the largest vessels; but there is no accommodation for visitors.

Nice has long been resorted to by invalids, for the sake of its winter climate, which differs materially from that of Provence, inasmuch as it is less dry, and is sheltered from the north winds and from the mistral by the maritime Alps, and the Estrelles, which terminate at the sea westward; but

still it is at times, especially in spring, liable to cold winds, and to the transitions which, without great precautions, render a residence in the south of Europe not unattended with danger to invalids. Hence much discrimination is required in the selection of cases likely to be benefited by its climate, as also in the choice of a residence, and as respects the proper period of remaining there. The season at which the greatest amount of rain falls (autumn) is generally over when strangers begin to arrive; and the months of November, December, and January are usually fine and warm, the temperature being seldom lower than 45 degrees in the daytime, and sometimes as high as 60 in the shade. The sky is mostly cloudless, of a deep blue, and the sun is often powerful in the middle of the day. The general character of the air is light, dry, and exciting, and the climate is consequently suited to most persons of a torpid or relaxed habit. Cold winds occasionally occur in these months, but are most felt in the spring, when they occasionally blow sharply over the mountains, at that period still covered with snow, while, at the same time, the sun acquires great power, rendering the climate extremely trying to invalids labouring under disease of the lungs and air-passages.

From the general remarks on the effect of climate it may be inferred that the winter climate of Nice, or of its environs, contrasting forcibly with that of the countries in which tubercular cachexy is most frequent, would tend to accomplish in many cases

of incipient consumption, or of a predisposition to the disease, the objects chiefly sought to be attained by means of this remedial agent in favourably modifying the abnormal condition of the system. The sunshiny days, the purity and relative dryness of the air, the variety of the scenery in the environs, the cheerful society met with, presenting many inducements to invalids to be much out of doors, cannot fail to produce a beneficial influence upon their physical state and mental disposition.

The climate is more especially indicated in cases where the patients are of a lymphatic or torpid habit, or where a scrofulous constitution is connected with tubercular disease, who are not very susceptible to be affected by atmospherical variations within a moderate range. To patients of an excitable temperament, or where there exists much irritability of the respiratory organs, with a tendency to recurring hæmoptysis, it would generally be prejudicial, though to many patients with whom a residence in the town or suburb near the sea would disagree, the more sheltered and equable climate of the villas under the hills of Cimiez or Carabacel would not be unsuited.

It is advisable for most invalids with pulmonary disease, not to remain at Nice throughout the spring, but to proceed further into Italy, or to some more suitable climate, or if remaining, to reside in one of the more sheltered localities of the environs.

[1] See "Nice and its Climate."

MENTON.

About five hours' drive from Nice on the Genoa road is Menton, which is remarkable for the mildness and equability of its climate. It consists principally of a street along the shore through which the road passes, inhabited by shopkeepers and artisans. Possessing no resources for occupation, notwithstanding the beauty of its site, Menton is not much frequented by invalids.

Foderé, in his 'Voyage aux Alpes Maritimes,' said of it: "The country is beautiful, the climate mild, the inhabitants well-mannered, yet after having seen the little there is to see, one feels a strong desire to go further on."

Though having a southern aspect, and being exposed to the sun's influence during the greater part of the day, there are but few houses where strangers could be accommodated.

Several patients after wintering at Nice, and desirous of seclusion, might pass with advantage a few weeks in the spring at Menton, in one of the hotels, where the accommodation is tolerable. The climate would be best suited to persons suffering from pulmonary disease in an early stage, accompanied with great susceptibility of the air-passages to atmospherical variations; though to some of these patients where the circulation is accelerated, and the cough and dyspnœa are urgent, a more humid atmosphere would be better adapted. In many cases, on the

other hand, the warmth of Menton, and the comparative deficiency of free ventilation, would be attended with enervating effects, as may be inferred from the general appearance of the natives, who are for the most part of an indolent or lymphatic temperament, with a tendency to *embonpoint*, and of placid disposition.

PISA.

About five leagues distant from Leghorn—fifteen from Florence (with which cities it is connected by rail)—and two from the sea, Pisa lies in an extensive plain, which after heavy rains is partially covered with water, on which account intermitting fevers were formerly prevalent; of late years, however, drainage has improved the salubrity of the district.

The town is of considerable extent, being inclosed by high walls, and is divided into two unequal parts by the Arno, which flows through it with a semicircular bend. The quays are handsome, the streets wide, clean, and, as in most towns of Tuscany, are paved with flag-stones. When formerly the capital of a republic, the population amounted to 150,000 souls; it does not, however, now exceed 20,000, which circumstance imparts to the town a melancholy and deserted aspect. Three stone bridges cross the river. The principal movement is along the northern quay (Lung' Arno), which has a southern exposition, and is the only part where invalids reside. Pisa possesses an Academy of Arts,

a university, a large public library, subscription reading-room, and a handsome theatre where operas are given. It is, however, but indifferently provided with promenades, with the exception of the Cascina, an extensive park, two miles distant, with fine avenues of oak and poplar-trees.[1]

ROME.

The valley of the Tiber is inclosed by two ranges of diverging hills. The Mounts Pincian, Quirinal, and Viminal, constitute the eastern limit of Rome; the Mount Mario, and the Vatican, which is almost continuous with the Janiculum, forms the limit on the west; whilst on the south are the Aventine, the Capitol, and the Esquiline. The river makes a considerable bend of which the concavity is directed towards the Pincian and Quirinal hills; its banks being rather low, the adjacent grounds are not unfrequently inundated after heavy rains; the inundation sometimes extending into the city.

Rome is surrounded by high and massive walls; the streets are for the most part narrow, and are often dirty, except in the neighbourhood of the Piazza di Spagnu, the quarter in which strangers almost exclusively reside. The fixed population amounts to 170,000 inhabitants.

Apartments having a southern aspect are more difficult to be obtained in the circumscribed stran-

[1] For fuller notices of Pisa, Rome and Naples, and for notices of Venice and Florence, see "Companion to the Continent."

gers' quarter, than in other towns in Italy frequented in winter, which, like Nice and Naples, are built along the shore, or like Pisa, where the visitors' quarter on the quay of the Arno, is fully exposed to the solar rays.

It is scarcely necessary to observe that Rome possesses more resources for occupation and recreation than any other place of winter resort. These are, however, not unfrequently detrimental to invalids, who are often induced to do more in the way of sight-seeing than they are able to accomplish without risk, and who are likewise negligent in guarding against the variations of temperature experienced at different times of the days, in cold picture or statue galleries, &c.

The environs afford ample scope for horse exercise, and the principal roads for carriage driving are maintained in tolerably good order.

NAPLES.

Naples has a south-western aspect. The city is seen to great advantage from the sea; its white houses extending for three or four miles along the shore, and rising on the acclivity of the hill whose summit is crowned by the Castle of St. Elmo. The prospect, comprising the Island of Capri, Ischia, and Procida in the bay, with Cape Misenum, on the one side, Vesuvius, and the coast of Sorrento, on the other, is generally acknowledged to be the finest in Europe. Most of the houses are lofty, and

the streets in the interior of the town are narrow, of which the inhabitants experience the advantage in hot weather from the exclusion of the sun, though the deficiency of ventilation, and the dirt which is allowed to accumulate, are productive of much disease.

With the exception of the Largo del Castello, there are few spacious places or squares; strangers reside almost exclusively in the parts fronting the bay, viz., Santa Lucia, Chiatamone, Chiaja, and Strada Vittoria. The public garden of the Villa Reale extends along the Chiaja, between the houses and the sea, and is prettily laid out, with shrubs, and parterres of flowers. Except this garden there is a great deficiency of shady walks at Naples, which, though possessing the resources of a metropolis, and usually delighting visitors on their first arrival, is nevertheless not in general a favourite place of abode for a protracted period. After its interesting environs have been visited, the city is not found to possess the attractions of Rome, whose neighbourhood abounds in walks and drives, in which respect Naples is deficient. The usual drive is along the shore, and the continual view of the bay is not unfrequently, after a time, considered to be monotonous. Neither is the society so agreeable as at Rome, which is also better suited to many invalids, and to persons of a retired or contemplative disposition, than the bustle and animation of Naples.

PALERMO.

This city is built on the shore of a vast bay, at the southern extremity of a plain of considerable extent, surrounded on the land side by verdant hills, partially sheltered from the east by the Monte Catalfano, and from the north by Monte Pellegrino; the hills and environs being embellished with numerous villas. The public garden, the Foro Borbonico (a spacious square), and the botanical garden, are the principal places of resort. The city possesses, however, but few resources for the recreation of visitors, and there is but little society.

Palermo is not much frequented by strangers, the greater number of whom lodge in a large hotel; a few live in smaller hotels, or take apartments, though eligible furnished ones are scarce. The mean winter temperature is higher than that of Naples (11.4); the north winds nevertheless frequently render the atmosphere cold, and are more particularly experienced in February and March. The air is less dry and exciting than that of Naples, and the transitions of temperature are less frequent and sudden.

From the beauty of its situation, its rides and drives, and the greater equability of its climate, Palermo is not an unsuitable place of abode for many patients with tuberculous disease, in whose cases a warm dry air is indicated, during the first months of winter. It would, however, not be advisable for them to remain during the spring, on account of the frequency of cold winds, from which

the town is not sufficiently protected, while at the same time the sun's heat renders the system more liable to be prejudicially affected by their influence. The annual amount of rain is stated to be only 21 inches, falling mostly in autumn and winter. If, therefore, the air of Palermo be not so dry as that of Naples, the circumstance must be ascribed to its insular situation.

MALTA.

This island is about sixty leagues in circumference, eighteen in length, and twelve at its greatest breadth. There are no mountains, the highest point not being more than 600 feet above the sea's level, on which account it is exposed to the influence of all the winds which blow upon the Mediterranean. Valetta, the capital, strongly fortified by nature and art, occupies a peninsula between the two natural harbours, the Grande, and the Marso-Muscetto. It is intersected by twenty-one streets (ten lengthways and eleven transverse) crossing each other at right angles; several of them are spacious and handsome, having foot pavements. The principal street runs through the centre of the town from the Porta Reale to the Piazza, in which stands the Government Palace, whence it is prolonged to the Fort St. Elmo. Many of the streets are not carriageable; in some, the ascent from the fort is so steep that flights of steps are cut. The palace is connected with the public library, which

contains 40,000 volumes, and several antiquities found in the island. Valetta likewise contains a university, a theatre, a union club, &c.

The mean winter temperature of Malta is 13 (somewhat lower than that of Madeira), that of spring is 17, and autumn 19. At certain periods of the year, chiefly from the middle of September to the middle of October, as also in spring, the rain falls with almost tropical violence, mostly in the night. The sirocco coming directly from Africa is extremely oppressive and relaxing; it prevails more especially in August and September, when the ground is parched up for want of rain. There is, moreover, in and about Valetta a great deficiency of shaded promenades, which renders it disagreeable as a residence for invalids. The climate in winter is tolerably equable; south winds sometimes prevail at this season for several successive days. The predominating wind, however, is the north-west, which, being deprived of its sharpness by its passage over so considerable an extent of sea, is rather agreeable than otherwise. The air is generally pure and clear, and except during the occasional prevalence of the north-east wind, the weather from the end of October to the middle of January is frequently delightful. After this, it becomes unsettled, and in the two following months, is often tempestuous and rainy.

The accommodation is good, the houses excellent, villas with orange gardens may also be hired in the

environs of the town. The best parts for a winter residence are those having a southern and eastern aspect near the Baraccas. Casal Lia, three miles distant, is a well sheltered residence adopted for pulmonary invalids, and close to the public garden St. Antonio.

Dr. Liddell states the climate of Malta to be more especially suited to cases of chronic bronchitis, asthma, scrofula, dyspepsia, hypochondriasis, and a generally disordered state of health.

Dr. Davy, in his work on "Malta and the Ionian Islands" (1842), remarks that, though the troops are subject to tuberculous disease—owing to irregularities of living, and the frequent vicissitudes of temperature to which they are exposed when on sentinel duty, in hot barracks and guard-rooms—the natives are comparatively exempt, as are also the English residents. A recent writer observes with reference to Valetta as a residence for pulmonary invalids:—

"In November I found the heat so oppressive in the daytime, and the chills in the evening so severe, that I was glad to make my escape. The extreme humidity of the atmosphere of the island, notwithstanding its high temperature, renders it an unfit resort for bronchial patients, and the greatness of the diurnal range of the thermometer, at least in winter, makes it questionable how far it is an eligible residence for consumptive patients. It is believed that an inquiry into the results will not

tend to give a favourable idea of its sanative influence in that class of complaints." [1]

I consider that, in general, Valetta is not a very recommendable place of winter sojourn for consumptive patients, who from the absence of shade would be often debarred from taking sufficient out of door exercise in the daytime, when they are liable to have the insensible perspiration, which is promoted by the heat, checked by the action of the winds, from some of which the city and its environs are not sufficiently protected.

Some individuals, however, of lymphatic constitution, and those predisposed to be affected with tuberculous disease, to whom the action of a moderately agitated atmosphere would be rather favourable than the reverse, by taking proper precautions against the transitions of temperature, would find the climate of Malta suited to them during November, December, and part of January, after which they might proceed to Egypt (a four days' voyage), to Rome (three days), or elsewhere, according to the kinds of climate indicated in particular cases, and with a view to avoid the cold winds which in January, February, and March not unfrequently prevail in the Mediterranean and along its shores.

MADEIRA.

The climate of this island has long been considered as most suitable to consumptive patients, and

[1] On the Climate of Egypt, by the Rev. Thomas Barclay.

doubtless is so when proper discrimination is used as to the cases sent thither, though it is but little adapted to a large proportion of persons threatened with the disease, or labouring under the symptoms indicative of its earlier stages. Funchal, the capital, the only part where strangers reside in winter, lies on the sea shore, having a southern aspect, the houses rising in an amphitheatrical form up the acclivity of the hill. On either side vine-covered hills intersected by ravines, and whose slopes are embellished by numerous villas or *quintas*, surrounded by gardens, extend inland until, by a gradual elevation, they become confounded with the range of mountains 4000 feet high, by which the island is divided.[1] The two cupolas of the church Nuestra Senhora del Monte appearing above a forest of chestnut trees at a height of 2000 feet above the town, constitute one of the most striking features of the scene viewed from the sea. The interior of Funchal does not, however, correspond to the anticipations raised by seeing it from a distance, the streets being, for the most part, narrow and badly paved.

[1] "The length of the island is eighty miles; its extreme width twelve and a half miles; circumference seventy-two miles. An elevated ridge, having a mean height of 4000 feet, forms the back bone of the island up to which ravines of great depth penetrate from both coasts; and these ravines are separated from each other by narrow salient spurs, terminating in lofty headlands. The coast is rugged, composed for the most part of frowning cliffs of basalt, sometimes attaining to a great height, as Caho Girao 1900 feet."—*White's Madeira, &c.*

The principal street, the Carriera (or Cours), bisects the town from east to west. The town is traversed by three rivers, which after heavy rains form torrents, though at other times their beds are nearly dry. A promenade extends some distance along the shore, but there are neither carriages nor carriageable roads. Exercise is taken on foot, on horseback, or in palanquin. Articles of consumption and goods are transported from one part to another on sledges drawn by oxen. The communication between the different parts of the island is consequently not very easy.

The editor of the recent edition of Mr. White's book gives but a poor account of the resources of Funchal, either for out-door or in-door recreation. "The town is a small place, and the accessible part of the country is soon visited—where then is the visitor to find amusement during the months of his sojourn? In truth, unless he has resources of his own, he is likely to be devoured with ennui long before the time for his leaving the island comes round.

"Some private balls, one or two public balls, a few picnics, perhaps a concert, or some amateur acting, this is all that strangers are likely to meet with in the shape of amusement." [1]

Hence though many invalids are, on their first

[1] Madeira, its Climate and Scenery, by R. White, Second Edition, Edinburgh, 1857.

arrival captivated by the novel aspect of the scenery, they are not unfrequently desirous of removing elsewhere after a brief sojourn. This, however, is not an easy matter—even supposing a different kind of climate to be indicated—considering the long voyage to be encountered, and the great distance of all other places of winter resort (except Lisbon) from Madeira; and if the views which I have expressed respecting the nature of pulmonary consumption be correct, it may well be inferred that the difficulties in the way of taking sufficient out of door exercise, together with the deficiency of resources for mental occupation and recreation, must, in many cases, prove impediments to the restoration of the blood to its normal condition, whereby the disposition to the formation of tubercle is corrected. The great equability of the climate, though advantageous in some of the more advanced cases of pulmonary disease, is not in other instances, as I have endeavoured to shew, beneficial as respects the removal of cachectic states of the system in northern constitutions possessing a certain degree of reactive power, and is not unfrequently productive of considerable relaxation, both in patients and in healthy relatives who accompany them.

Notwithstanding that the sky is mostly unclouded, the winter climate of Madeira must be considered as rather moist. According to the following table, published by Drs. Heineken and Heberden in the "Philosophical Transactions,"

deduced from ten years observation, it appears that the winter is the most rainy season.

		Days on which rain fell.	
Winter . .	13·48	48	
Spring . .	4·74	17	
Summer . .	1·94	4	
Autumn . .	8·38	31	
Cubic inches.	27·29	100	year.

"The autumnal rains," says Dr. Heineken, "generally commence towards the end of September, and terminate in December; they have more the character of violent and intermitting showers than incessant daily rains. The winter rains set in and prevail, more or less, throughout January and February, and are far more decided and tropical. March and April are showery and windy. In June, July, August, and part of September we seldom have a drop of rain."

Heberden states that the fall in seven years gave an annual mean of 30·32 inches. In Johnson's "Physical Atlas," the yearly fall of rain is stated to be 29·52, and the distribution of the annual quantity amongst the seasons is given in parts of 100; viz. 48 in winter; 17 in spring; 4 in summer; and 31 in autumn.

Dr. Mittermayer found the mean annual number of days on which rain falls to be 94; the mean for eight years 88. This author ranks the climate as

of the damp section, yet it is by no means to be considered as excessively damp.[1]

Madeira according to the editor of Mr. White's book, and Mr. Johnson a non-professional man, presents the advantage of possessing more comforts and conveniences than any place in the south of Europe, and also that invalids may remain in the island throughout the year, resorting to the Santa Anna district on the north coast—six hours distant from Funchal—in the summer season, where there are several detached houses adapted for the accommodation of visitors, and for those whose state of health requires that they should reside altogether in a warm and equable climate, there is perhaps no locality that would be preferable to Madeira. Many other persons, however, after passing a winter or two in a climate possessing the character of equability in so high a degree as that of Madeira, would, on leaving, find themselves more susceptible to be affected by the atmospheric variations which they would have to encounter in other places less favoured in this respect.

Mean temperature of the seasons deduced from a comparison of the tables of several authorities. Winter, (December, January, February), 61·32; spring 64·25; summer 69·77; autumn, (September, October, November), 67·36. Mean temperature of the year 65·68.

Dr. Mason did not give a very favourable account

[1] White's Madeira.

of the climate in his work, published a few years ago. Mr. White remarks that his observations were made during one of the most unfavourable seasons, and in an unfavourable situation in the environs of Funchal. Mr. White admits, however, that on account of the position of Madeira, and of the irregular nature of its surface, the sky is not so clear, nor the atmosphere so calm as in some parts of Italy. He observes that northerly winds prevail during eight or nine months of the year; but that Funchal is sufficiently protected from their direct influence by the high mountain range extending from east to west. The hot and dry wind (leste) which occasions extreme oppression and *malaise*, rarely blows during the winter months.

The meteorologist, Schouw, referring to the relative humidity of the climate of Madeira, observes that the concentration of the amount of rain upon the winter months is more marked than at Palermo, and the southern portion of the Italian peninsula. The annual quantity of rain, he adds, is somewhat greater at Funchal than at Lisbon, as might be expected in a mountainous island of the Atlantic.[1]

With reference to the prevalence of consumption among the native population, there has existed considerable difference of opinion among the English physicians who have practised on the island. Drs. Heineken and Gourlay stated that no disease was more common. Dr. Benton, on the other hand,

[1] Tableau du Climat et de la Végétation de l'Italie.

said that the natives were comparatively exempt from the disease, though he admitted that "owing to their mode of living, bad food, &c., diseases of the lungs are frequent, and these being neglected or improperly treated, often prove fatal in a chronic form simulating phthisis.

This result, as I have already observed, is found to occur in several of the towns of Italy, and in other places where the climate is generally mild among the poorer classes of the population, and as respects Madeira, Mr. White remarks that pulmonary affections are rare among the upper classes, affecting mostly the poor inhabitants who are exposed to the anti-hygienic causes already specified, and to chills while their bodies are in a state of active perspiration.

Dr. Mason states that "affections of the digestive organs are very general, being the principal cause of death with the majority of the inhabitants. I am afraid," he adds, "that were the subject more thoroughly investigated, as it ought to be, few places would be found where the system is more liable to general disorder, while at the same time I suspect that the average duration of life would turn out to be inferior to our own country."

These remarks need not, however, deter those invalids labouring under pulmonary disease to whose cases the climate would be suitable from resorting to Madeira, as analogous, or other drawbacks will be experienced at most places; they may, however, serve to shew that the perfection as respects climate

as in other things which patients are frequently led to anticipate from partial representations, is not to be met with; and also that much discrimination is required in order to determine in what cases Madeira would be preferable to other places of winter resort.

MALAGA.

The south-eastern coast of Spain is celebrated for the mildness and equability of its climate, and for the dryness of its atmosphere. The climate of Malaga partakes, in the highest degree, of those properties. This city, one of the most important of the peninsula, has a population of 80,000 inhabitants, is situate directly on the shores of the Mediterranean, having a southern aspect, and is sheltered on the eastern side by a lofty hill crowned by the ruins of an ancient Moorish castle. A range of hills rises to the height of 3000 feet north of the little plain bordering the city, which is partially exposed to the influence of the western breezes. The Alameda, a public promenade of circumscribed extent, is the part most frequented by visitors, who for the most part reside in the hotel of the same name, the Victoria, and other smaller hotels; there being no furnished apartments obtainable in any desirable part of the town.

Notwithstanding its size, Malaga does not present much resource for recreation. The country in the immediate neighbourhood is not particularly in-

teresting, though there are some agreeable rides among the hills three or four miles off, and the roads are but indifferently kept. In the principal streets and squares, as also on the quays, there is a good deal of bustle and animation, and the Moorish aspect of the houses interests the stranger from the contrast which it presents to that of other European cities.

From the superiority of its accommodations, and on account of the advantages of its climate, Malaga is the most frequented, of all the towns of Spain, by invalids from other countries labouring under pulmonary disease, and a residence for one or more winters, would be well calculated to produce permanent amelioration—if not a cure, when this is practicable—in those cases in which this kind of climate is indicated. Having, however, already described the place at some length, and specified the peculiarities by which the climate is characterized, I beg to refer those desirous of detailed information to my work on Spain.

ALGIERS.

Algiers may be regarded as an excellent station for many patients labouring under the more chronic forms of phthisis. It possesses, moreover, the advantage of being comparatively accessible to those who are not apprehensive of encountering a forty-eight hours voyage. According to the testimony of the French physicians, resident in Algeria, con-

sumption is of extremely rare occurrence in all that part of the country comprised between the sea and the mountains, being scarcely ever met with, unless among the negroes who have migrated from much hotter countries.

One of these gentlemen, who has published a work on Algeria, gives the following details respecting Algiers.

"The city rises in the form of a pyramidal amphitheatre from the high road Kar-Eddin, up to the summit of the hill where the Deys possessed a bastioned fort, now called Fort l'Empereur. Behind is the northern acclivity of one of the digitations of the Atlas, formed by the Sahel, of which the principal at this point is the Mont Boujareah. The town is thus isolated from the plain of the Mitidje, and is expanded like a great white veil to receive, on the north-west, the sea-breezes which bring with them a certain amount of humidity."

"The year," adds this author, "is divided into two great seasons, viz.: of the rains and heats. The former lasts from November to April inclusive. During these six months, there are, however, numerous fine days, since there are not on an average more than 50 or 60 rainy days. The annual mean of the fall of rain (for four years) has been 79 centimetres, of which 65 were supplied between the above-named months, and only 14 during the other months.

"It very rarely snows on the shore; the winds which prevail during the rainy season are mostly

the north-west, more rarely those of the north-east, still more so the south; but very frequently the west, which may be termed the rainy wind. The thermometer of the observatory only once descended to the freezing point in the course of seven years.

"Owing to the changes of the wind, the variations of temperature are sometimes very abrupt in Algeria. Except when the sirocco blows, the evenings are cool, the thermometer descends on an average to 20 degrees, and the humidity of the atmosphere is very manifest, especially on the shore. On this account the Place du Gouvernement, which overlooks the port, becomes deserted at an early hour in the evening, every one seeks to avoid the extreme humidity, which penetrates the clothing. Windows must be closed, especially those of apartments which are exposed to the current of sea-air, under a penalty of a serious disorder of the health. This humidity progressively increases during the rest of the night, and attains its maximum in the morning.

"To the tropical summer heat succeeds, almost without an interval, the cold season, beginning with the autumnal rains. Then, as in winter, the sun comes to strike you with its still ardent rays, only to make you feel the more sharply the severity of the north wind, or of the damp cold, darkening the western horizon with its threatening clouds; in a word, intensity and variability of all the atmospherical elements from one instant to the other,

from day to night, from season to season; such are the characteristic features of the Algerian climate, which may, with reason, be called an excessive climate.

"The new-comer generally experiences an increased activity of all his functions—the appetite and digestion are improved—the muscular power is increased, and a kind of plethora ensues, characterised by fullness of the pulse, and peripheric expansion. This excess of functional activity is allied with excitation of the nervous system—man becomes morally more susceptible, more irascible.[1]

The preceding remarks, it will be observed, appear to contradict the opinion that humidity is a principal cause of the formation of tubercle; they refer, however, less to Algiers, and its neighbourhood, than to Algeria in general, among the population of which M. Armand observes, phthisis is not unfrequent, and, as respects the influence of the climate upon soldiers affected with phthisis, in different stages, he adds that "they do not find in the climate a curative action capable of arresting the disorder." He quotes, moreover, M. Laveran, who says, "it is far from being proved that those in whom the disease has declared itself, should seek, in the variable temperature of our new possessions, modifications favourable to their condition."

M. Oldrutz, physician to the civil hospital of Algiers, who is likewise quoted by M. Armand, remarks, however, that the climate is opposed to the

[1] L'Algérie Medicale—Dr. Armand. Paris, 1854.

formation and development of pulmonary tubercle, which, he says, is but seldom met with among the natives; and that Europeans, who do not bring with them the germ of the disease, scarcely ever become consumptive; while those who, independently of a tuberculous origin, present all the attributes of the inconvenience of phthisis, often escape the disease, especially if subjected to an appropriate regimen. As respects individuals who arrive in Algiers, not only with a pre-disposition to phthisis, but even with crude tubercles disseminated in greater or less number throughout the lungs, they often get well, and, in the less favourable cases, the disease remains stationary, or makes only slow progress. When the softening process has commenced, the action of the climate of Algiers is no longer so favourable, and it ceases to be advantageous when the disease has reached an advanced stage, the patients then very speedily succumb, especially nervous subjects, and when the weather is hot.

"Most of these propositions," remarks M. Armand, "are, at least, anticipated, inasmuch as they have been deduced from insufficient data. They cannot, therefore, enable us to pass a definitive judgment upon the question, even as respects Algiers, much less as respects the climate of Algeria in general."

Notwithstanding that the fall of rain in the winter months is often considerable at Algiers, yet, as the largest proportion falls after sunset, and at night, while the sun shines brightly in the day-

time, the atmosphere cannot be considered as humid at the period when the general population is in great part engaged out of doors. The rain, likewise, often falls in large quantities at once, and in a short time, sometimes for thirty-six hours, without ceasing, leaving a long interval of fine days, so that invalids are rarely debarred from taking exercise. Hence general disorder of the health, and the suppression of the cutaneous functions are less likely to occur than in places where the climate is either cold and damp, or moist, and, at the same time, relaxing from the high temperature, and from the deficiency of sufficient ventilation. When ordinary precautions are taken, a moderate range of atmospherical variation is, as I have already observed, rather favourable, than the reverse, to patients in the early stages of pulmonary disease; and it appears that, when the natives of Algeria are attacked by phthisis, they frequently have recourse to out-door exercises, and other means calculated to increase the activity of the circulation through the periphery, and, consequently, of the exhalent function of the skin. Thus, M. Colin remarks that, phthisis is more common than is generally supposed at Phillipeville, and that, when a young man perceives that he is attacked by the disease, he leaves off all work, eats of everything according to his fancy, putting strong spices into his food, drinks strong liquors, takes active exercise on foot and horseback, addicts himself to women, &c.; some get well by pursuing this system. Mr. Jacob quotes, in confirmation, the instance of a

young man who was pronounced to be consumptive by a French physician, and as such was put upon a milk diet; but a Mozabite induced him to have recourse to the above-mentioned extraordinary regimen, and he regained his health.

Dr. Mitchell, who has published a notice of Algiers in the "British and Foreign Medical Review," states the climate to be of a dry and bracing character; and, as I have already remarked, it may be justly entitled, notwithstanding the great fall of rain in the winter months, to be so considered *in the day-time*, which principally concerns invalids. His account is calculated to convey a most favourable impression of the locality.

"About thirty miles inland, the little Andes forms the boundary of a vast marshy plain, between which and the sea extends the range of the Sahel hills, varying in height from 500 to 1300 feet. These hills are cut across by winding valleys, of the most charming beauty. Their flora is luxuriant and varied, their sides are ornamented with Moorish villas; orange and lemon trees are met with at every turn, the pomegranate, the olive, the almond, the carob, the mulberry, the fig trees are in every garden, while more rarely the stately date-palm, the flowering aloe, and the rich banana are brought into contrast with the dark gloomy cypress, and, perhaps, with some solitary stove pine. A stroll along the old Arab walks which creep up these valleys, is certain to please the most fastidious taste; they extend for miles, and you may vary them every

day of a winter's residence, and each one will be found to have something new.

"It is on the northern slope of this range of hills that the city of Algiers stands. A half circle indentation with Cape Matifou, and the Pointe Pescade for its seaward extremities, form the Bay of Algiers, whose waters wash the feet of the Sahel or Boussaria at many points, while at others small fertile plains intervene. Where Algiers stands, the slope is prolonged almost to the water's edge, so that as you approach the town from the sea, it seems to cling to the side of the hill, and is not unlike a great chalk quarry; the houses being all white-washed, and disposed in irregular terraces. It expands along the shore from the gates of Babel-oued and Babel-azoun for about a mile, and becomes narrower as you ascend to the old fort of the Custah, which is the culminating point, and about 400 feet above the level of the sea. The attention is pleasingly arrested by the cheerful-looking suburbs of St. Eugene, on the one side, and Mustapha on the other; and one cannot but be struck with the countless Moorish villas with which the hills are dotted, half concealed in the luxuriance of the vegetation which surrounds them."[1]

Dr. M. gives the following details respecting the climate. The mean annual temperature is 69° 13′; the mean of each season, as follows: winter 61° 13′, spring, 61° 4′; summer, 75° 09′; autumn, 70° 26′.

[1] Algiers, its Climate, and Merits for the Invalid.

Difference between mean by summer and winter, 12° 86′.

As regards temperature, the year may be rather divided into two seasons than four. Winter scarcely differs from spring; together they constitute the temperate season, while they are separated by a range of some 14° or 15° from summer. The mean annual temperature more nearly approaches that of Malta than of other resorts of the invalid. It exceeds it by 2°, Madeira by 4°, Malaga by 3°, Rome by 9°, Nice by 10°, and Pau by 13°. The mean annual of Cairo is 3° higher, yet its winter is 4° colder than that of Algiers. As respects winter and spring, Algiers and Madeira are almost identical, but the difference between winter and spring is less than at any other place with which I am acquainted. Spring is about equally warm at Malta, Madeira, Malaga, and Algiers. The Algerine winter is 2° warmer than Madeira, 5° warmer than Malta, 8° than Malaga, 15° than Rome, 14° than Nice, and 15° than Pau, while the spring at Cairo, which is 15° warmer than its own winter, is 11° above that of Algiers.

There exist diurnal tides by winds, as at Nice and Genoa.

There is a striking difference between the amount of rain falling in the corresponding months of different years. Thus, 14 inches fell in one December, while less than an inch fell in another; 10 inches fell in one November, and not one in another; and 15 in the February of one year, while scarcely more

than 1-10th fell in that of another. Very little rain falls in June, July is rainless, and August nearly so. About the same quantity of rain falls during the first as during the last three months of the year, and more than double that which falls in the intervening months. (M. Bourget—Moniteur Algerien).

	3 months.	6 months.
From December to February	17·54	25·13
„ March „ May	7·79	
„ June „ August	0·87	11·05
„ September „ November	10·18	
		36·18

Or the year may be divided into the rainy and dry seasons, viz:

	Inches.
From November to April	28.74
„ May „ October . . .	7·44
	36·18

The mean annual fall of rain at Algiers is high, exceeding that at Rome, Florence, and Constantinople, by 5 inches; Madeira by 7, and Nice by 12, and by the same quantity even that of London and Undercliff. The fall of rain at Gibraltar exceeds it however by 10 inches, at Pau by 6, at Penzance by 8 inches.[1]

"The shower is scarcely over, when the invalid

[1] The seasons vary, however, in this respect. Last winter was very rainy.—E. L.

can leave his room for exercise in the open air; the streets and roads are already dry, the sky cloudless, and the sun bright and cheering. This arises from the city and suburbs being built partly on a slope, and partly from the nature of the soil, the course of the shower, and the dryness of the lower stratum of air. Indeed, I believe the invalid will not be confined to his room by rain more than half a dozen days in the season of seven months. For although, properly speaking, rain falls on an average 96 days in the year, yet speaking of the day as opposed to night, and so considered, it most directly bears upon the invalid's comfort—it only falls in 56 days, and only for the greater proportion of these only for an hour or two.

"The winds which prevail most are from the north-west, which form 30 per cent of the whole observations, while the sum of those from the northerly points constitute nearly one half. Southerly winds are rare, and (according to Captain Humbert's tables) west winds are three times as frequent from November to April, as from May to October; while on the other hand, east winds double these numbers from May to October, and the northerly add 50 per 100. In this respect Nice is exactly in the position of Algiers reversed, southerly winds being more frequent from November to January than from July to October, and southerly are more prevalent from May to October than from November to January. It is probable that Colonel Sykes is correct in attributing these prevailing winds to the

influence of local accidents, the cold dense air flowing from the tops of the Alps into the warmer and lighter air of the basin of the Mediterranean. Adverting to the dryness of the climate, Dr. M. remarks, "I have frequently observed that in taking exercise, although from the warmth of the atmosphere, perspiration was tolerably free, yet it was so rapidly and freely removed, that no oppression was felt. Indeed the climate was always spoken of as bracing, and never as relaxing in its properties. It was sometimes called moist by those who argued from the quantity of rain which falls annually, but this rain is seldom the condensation of vapours in the stratum of the air next the earth, but in the one above, and occurs in short heavy showers."[1] Dr. Martin observes: "En Algérie un nuage vient, il se juge de suite; le soleil le dissipe, ou bien il tombe en masse." Sea fogs occasionally occur, but are soon dispersed. Algiers is as warm and steady as Madeira in winter, but drier and more bracing. Bad weather occurs as everywhere, but few climates are superior and more likely to be beneficial in that class of patients who seek for health in a more genial temperature and a less cloudy atmosphere than our own. Among all classes of the population civil or military, on the coast as in the interior, 20,955, deaths from all causes showed 759 deaths from phthisis—in 27·6 or 3·6 per 100. Among

[1] The authorities on the climate referred to by Dr. Mitchell are:—Doctors Broussais, Bonafond, Guyon, Cateloup, Oldrutz, Moreau, Martin, and Bertherand.

the European and civil population of Algiers, in hospital or in their own houses, out of 9,262 deaths from all causes, there were 441 from phthisis, —1 in 21, or 4·8 per 100. In the civil hospital at Algiers, in 4862 deaths, 241 were from phthisis. Among the European population in their own houses, in a mortality of 94,819, there were 200 deaths from phthisis. Among the military population in the hospital, 71,107 deaths, 46 were from consumption. The immunity is enjoyed in a higher degree by the Mussulman than by the European population, and by the latter in a higher degree by the military than the civil population. Those who live in towns in the interior, are farther removed from chances of death by this disease than those who live on the coast.

EGYPT.

The winter climate of Upper Egypt, which is remarkable for its mildness, dryness, and equability of temperature, is, perhaps, more than any other, calculated to render service to a large proportion of invalids labouring under phthisis in the earlier stages, and some other forms of chronic pulmonary disease, not characterised by general excitability of the system, or vascular plethora. This climate presents a marked contrast with that of Lower Egypt, which, especially near the mouth of the Nile is characterised by the humidity of the atmo-

sphere. According to a recent writer, "Alexandria is hot and oppressive, the air is saturated with humidity, the sun may, and does shine with unclouded splendour, but the town is bathed in a subtle vapour, imperceptible to sight, but rendering the very clothes one wears palpably clammy. Dr. Barclay found the air of Alexandria, at the end of April and beginning of May, during a continuance of clear sunshine, to be as many as 15 degrees damp, taking zero to represent the summer drought in Britain."[1]

In Alexandria, consequently, several diseases unknown in Upper Egypt are prevalent. Dr. Barclay, who suffered from chronic bronchitis, remarked in a paper published about two years ago in the Edinburgh Medical and Surgical Journal:—"Of the climate of Alexandria I have reason to speak unfavourably. In Cairo, however, a very different climate was found, and I experienced its effects in allaying the irritability of the respiratory mucous membrane."

"The coldest season is the latter part of December, and the beginning of January, though the temperature even then is equal to our best summer weather. Yet the evenings are somewhat chill. From observation, it will appear that warm and equable as the winter temperature is at Cairo, the weather is not free from frequent and sudden changes. It is in Upper Egypt that the invalid must seek an entire

[1] Egypt and its Climate, &c. By A. H. Rhind. Edinburgh, 1856.

exemption from these, and there he will not be disappointed. From January 17th to the 25th, between Thebes and Assouan, the uppermost town in Egypt, the lowest temperature at night ranges from 63° to 69°; highest temperature by day from 68° to 72°; sunshine every day, firmament blazing with stars; no evening chills.

"At Thebes, the head-quarters of Upper Egypt, the day temperature, from the middle of January to the middle of February, ranges from 68° to 76°; the same as at Cairo in the first week in March.

"Cairo possesses a dense population of 200,000 souls. The streets are narrow; the houses lofty, the air, though dry, is less so than in the Desert. The climate may be considered as rather sedative as compared with the more exciting climate of Upper Egypt.

According to Dr. Clot-Bey, pulmonary consumption is almost unknown among the natives, and only attacks the negroes, who come from the still hotter climate of Abyssinia and Nubia. M. Prüner considers that principal reason why the Nubians become consumptive in Egypt, is the change in their habits, from a nomadic, unfettered life, to a greater or less degree of domesticity. It should be observed, also, that the valley of the Nile is more humid than the air of the Desert, or of Nubia, and that the negroes are mostly employed as slaves.

Mr. Rhind observes that the mean temperature of November at Cairo is about the same as that of

London, or the south coast of England in the warmest month of the year. According to Dr. Abbott's register, in December, the mornings and evenings are chilly, the other portions of the day pleasant and warm.

"On an average of six years, at various intervals between 1762 and 1856, from the middle of November to the middle of April, rain falls on about fifteen days and nights, chiefly in January and February, but on the majority the fall of rain consists in a few drops, or light showers. The accompaniment of hail is experienced once or twice, not every season, and frost is very rare, occurring before sunrise. Continued fogs are uncommon, but disagreeable; and boisterous, if not always cold winds, are more frequent visitors.

"In the upper country, high winds are not common, and they seldom last long; even the light breezes die away at night. Throughout the whole season in question, the air current flows with steadiness from the north; the breath of the Khamseen from the south and south-east does not regularly set in until May; its visitations are intolerable.

"The Desert air, though destitute of humidity, is soothing and inspiriting. Returning to Cairo about the middle of March, the invalid meets with a temperature and sky very much the same as in November. The uniformity of the atmospheric phenomena is almost unvarying, and has been adverted to by Herodotus, Strabo, Pliny, &c."

This author justly remarks that "consumption is a disease of the general system, and is not to be met simply or sufficiently by anodyne applications to the organ where it exhibits itself, as furnishing a balmy atmosphere to the lungs, though this is by no means an unimportant element;" and I am of opinion that much of the advantage which pulmonary invalids derive from wintering in Egypt, is owing to their being so much exposed to the fresh air in sailing up and down the Nile, by which the insensible perspiration is promoted, and the cachetic condition of the system is frequently remedied. The novel mode of life, the aspect of a country, and the habits of a population, altogether different from those of Europe, together with the interest inspired by the colossal monuments of antiquity, cannot but produce a most favourable influence upon the *moral* of patients, and tend to ameliorate their health. Steam-boats now occasionally make a transit from Cairo to the upper country, but inasmuch as travellers for health would, by this means arrive too speedily at the place of their destination, where they would remain more or less stationary, I think that the navigation of the Nile in boats, which offers the advantage of constant change of air and scene for some weeks, enabling travellers to stop and land where they like, is infinitely preferable to the steam conveyance. Those patients, to whom the excitation of travelling, and of the drier atmosphere of Upper Egypt would be likely to prove prejudicial, if they

have been induced to make choice of this country as a winter abode, would generally do better by remaining quietly in the more sedative climate of Cairo, taking daily exercise so as not to occasion fatigue. It should, however, be considered, that, because a patient may have derived benefit from a winter's sojourn in Egypt, it does not necessarily follow that the same country—having no longer the attraction of novelty—would be the most desirable place of abode for another winter. The voyage there and back likewise constitutes an objection as respects many invalids.

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