do well in such company; only they are not the cases with which from choice we should wish to surround patients having recent wounds, especially as it needs constant watchfulness to prevent communication between such neighbours. No patient, indeed, should be allowed to come into contact with another in any way; each one is practically isolated, the dressings for each one are kept separate, and, unless rules be wilfully broken, no soiled hands approach a wound to touch it. When an operation is decided upon, the site of the patient's bed is carefully chosen; if a bed be vacant in the ward, he has the benefit of the greater space; if not, a patient who is up during the day, or one not suffering from a wound or from any discharge, one who is undisturbed by pain, and who rests well, should be selected as the neighbour, and the beds in the ward should be shifted, if necessary, accordingly.

Need it be added that the wards should be scrupulously clean. Perhaps one grows to be over-particular, but one cannot err in insisting that the room should be systematically cleansed from day to day, so as to avoid all accumulation of dust, and in seeing that the soiled dressings are burned or removed, and that no excreta are left about in the ward. It is very well to say that, by the use of antiputrescents, all risks are avoided; but an untidy ward means carelessness on the part of some of the officials, which may grow into neglect of more important details.

Well, you will say, all this has long been known. It is true that it has; but it has not been rigorously observed in practice. I have been in wards—I do not so much refer to this country—in which, from non-observance of these precautions, the surroundings of the patients have been such that no one could wonder at a terrible mortality after capital operations. I remember being told by a surgeon, to whom I was speaking of these things, that for years all these rules had been observed; but he added, directly we perceive a bad smell, it is corrected. Now, here is the entire difference: we make sure that nothing of the kind shall be detected and corrected; for it is prevented from having any existence.

There are many little things you must see after yourselves, or they are liable to be overlooked. The bed and linen should be fresh and clean. Before an operation, it should be renewed, and, before the patient is placed in the bed, it should have been thoroughly warmed. The bedstead should be supported, if the case be a critical one, upon blocks of India-rubber, so as to obviate all jars from movements in the ward, and by means of a ventilating cradle, if the lower extremity be the part concerned, or otherwise, according to the operation, the free access of air about the dressings should be ensured. See, too, that sufficient pillows are provided; a small one here or there will often give great relief; and never, let me say in passing, neglect the complaints of your patients as to position; it is so easy to satisfy them by some slight shifting of the bed or of the part which is uneasy, and it is vexing to the sick man to be denied. He may, indeed, work himself into a state of much constitutional disturbance. One day, in going round Harley Ward, we found a man who had a severely lacerated wound of the forearm, and his arm was swung with a counter-weight. Although the wound was doing well, he said that the position of the arm was, and for some time had been, uncomfortable, and he had a rapid pulse and a high temperature (pulse, 100; temperature, 104 deg. Fahr.) We took the arm off the splint, and rested it on the bed, and, before we left the ward, his satisfaction showed itself in a quiet pulse and a natural temperature.

There are appliances, too, which you must see after, and which often have to be made especially for each case, if the patient is to go at ease to convalescence. There are now in Sitwell Ward two instances in point. There lies a woman for whom we opened an enlarged bursa beneath the annular ligament of the wrist. As it was important that the parts should be kept at rest after the operation, a splint was contrived for her which allowed the wound to be dressed without any disturbance of the parts, the arm being at the same time swung with a counter-weight; and she was trained to bear the restraint by using the splint for some days prior to the operation. In the same ward is a girl who has been also trained to bear a splint which has been made to ensure extension of two fingers which were contracted upon the palm, and which have been straightened by operation. In this instance, our treatment aims at making the wounds heal in the long axis of the fingers, so as to prevent the recurrence of the deformity, and our machinery is adapted to ensure this result.* On the other hand, however fit an apparatus may be, unless the patient have been accustomed to it, and it has got to its bearings before the operation, he is very likely to resent it as uncomfortable. The man in Darker Ward, from the back of whose neck a keloid growth was removed, suffered in this way. We were anxious that the parts should be kept at rest after the operation, and, to ensure this, a splint was moulded to the

back of the head and to the shoulders; but unfortunately it had not been worn by the patient before the operation, and so, when it was put on, it was irksome, and had to be removed, and the object we had in view was defeated; for the wound was not kept at rest, and, therefore, failed to unite by the first intention.

Occasionally, it must be confessed, our patients suffer from our defective arrangements; and there was one woman (the only case of blood-poisoning we have had during the last three years) who got into trouble in this way. She lay in Sitwell Ward, and was in bad health; indeed, she had a cancerous growth infesting the middle of the right femur. It was thought well to amputate at the hip-joint. As it seemed likely that this feeble woman might suffer from bed-sores, a water mattress was ordered for her. Unfortunately, after the operation, we found that, by displacement of water, the mattress was forced up against the stump, and the practical evil which grew out of this was, that we failed to keep the wound thoroughly drained. Discharge was shut in, and the woman was poisoned, and died. The pains we had taken to guard against one trouble created a difficulty which, perhaps, we ought to have foreseen, and which caused me great regret.

A great deal of forethought and care must be expended upon these details of appliances, and you must be prepared to think out the best way of dealing, by anticipation, with conditions of the future. It is a great point gained to prevent, as you may prevent, some small trouble from arising, and the repose of an injured limb for days, or the redressing of a wound, has always to be provided for at the first arrangement of supports and coverings. You will notice this if you watch the progress of an amputation-wound; for by the studied fit of the first dressings, and by the facilities given by the fall provided by the hinged anterior portion of the swung splint,* it is no exaggeration to say that, from the recovery from the anæsthetic after the operation to complete convalescence, your patient should suffer neither ache nor pain at the hands of the surgeon.

LETTSONIAN LECTURES

ON

THE INFLUENCE OF CLIMATE IN THE TREATMENT OF PULMONARY CONSUMPTION.

Delivered before the Medical Society of London.

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LECTURE III (*concluded*).

WE now come to the *very dry climates*, which include the Cape, Natal, and Egypt. The two former have moist and stormy summers, but their winter climates are dry, and we therefore class them with Egypt.

Now, Egypt is the type of the dry climates, and especially so is the desert, though which the Nile boat-travellers wend their way to the second cataract. The rainfall is very small, and the number of rainy days rarely exceeds fifteen in the year. Mr. Flower, in his excellent papers in the BRITISH MEDICAL JOURNAL of 1874, states that, during that winter, when more rain fell than had been known for years, there were eleven rainy days out of one hundred and fifty, and in some of these but a few drops fell. The mean winter temperature is 58.52 deg. Fahr., and the range of temperature is greater than on the Mediterranean shores; but it is very rare for the freezing points to be reached, even at night. Heavy dew occurs there, and the early mornings and the nights are cool and refreshing. As a general rule, Mr. Flower says, the days are very much like one another, fine, clear, bright, and sunny, and the subject of the weather, so important in our island home, soon loses its interest from being devoid of change.

The main object of a visit to Egypt is not to stop at Cairo, although its climate has been found useful, and in certain cases it is preferable from greater comforts and medical advice, etc., being obtainable, and living arranged on a more economical scale for those whose means are limited. Nor is it to spend time at Ismailia or Suez on the famous canal. Invalids should generally ascend the Nile in a dahabiah; and it is this voyage up eight hundred miles of river, flowing, for the most part, through desert, that is fraught with such benefit to the phthisical. The boats contain fair sized and airy cabins, are well stocked with good

* This patient made a good recovery, with useful movement in the fingers.

* These splints are described in the BRITISH MEDICAL JOURNAL for 1873, vol. ii. They were first suggested by my house-surgeon, Mr. Brewer.

food, and most of the comforts which an Englishman can desire are obtainable, while they halt sufficiently often to allow proper exercise and rambles on shore. The patient is spared all fatigue, and supplied with the pure dry air of the desert, his mind being perpetually occupied by a succession of objects of interest offered by the glorious monuments of the past and by the picturesque and remarkable studies of present life in Egypt. Such are the conditions under which patients are now generally placed, though I am afraid our tabulated patients were not all so fortunate. However, the results are that, out of twenty patients, who passed in Egypt twenty-six winters, 65 per cent. improved; 25 per cent. remained stationary; and 10 per cent. became worse. This is very far the finest land result we have to offer. It is to be regretted that the great expense of the trip to Egypt and the ascent of the Nile puts it beyond the means of many.

The few patients who wintered either at the Cape of Good Hope or at Natal, seem to have been less prosperous; for, out of the nine patients, who were chiefly first stage cases, and belonging to no special variety of phthisis, four improved, two remained stationary, and three became worse. These numbers are evidently too small to enable us to pass judgment on the climate of this part of Africa; and unfortunately I have no results from Bloemfontein, which has been highly spoken of by Dr. Symes Thompson.

Among the miscellaneous climates, it may be noted that India gives good results; but we must not forget that, of ten patients who resided in various parts of the country, six were in the first stage, and only two in the third. One of these, who had a very large excavation in one lung and some consolidation in the other, lived for upwards of ten years, and during the greater part of this time did active duty as a colonel of a regiment in a hot part of India, also engaging in field sports, including tiger-hunting.

Twenty of our list made trial of voyaging in various parts of the world; and these, with the exception of one female, were all males under forty years of age; the number of voyages was nearly fifty, for I have added two more patients to the list since that table was constructed. As regards the nature of the cases, six originated in inflammatory attacks, two in bronchitis, four were of the ordinary chronic tubercular form, two were scrofulous, one hemorrhagic, and one asthmatic; 72 per cent. were in the first stage, 11 per cent. in the second, and 16½ per cent. in the third stage. One patient voyaged to China and back; three went to and fro between America and the West Indies and home; three went to the Cape or Natal and back; one patient took trips in the Indian Ocean; eleven journeyed between Australia, New Zealand, and England; and in most cases the voyages were repeated several times.

Those who went between the West Indies and our own islands showed good general results, but locally did worse than the rest of the number. The longer voyages were of most use to the patients, only one of those who visited Australia and New Zealand becoming worse, and he having returned overland by India; all the others improved vastly in general health, and, with the exception of two, exhibited diminution in the local disease. One gained as much as twenty pounds in weight during the outward voyage.

The results of these sea-voyages are that 89 per cent. of the patients improved; 5½ per cent. remained stationary; and 5½ per cent. became worse. This was the most favourable of all our climatic experiments; and it is for this reason that I propose dwelling more at length on the conditions under which a phthisical invalid is placed during a voyage for the sake of health.

Of all sea-voyages, the one to Australia or to New Zealand is the most to be commended, and it has largely come into fashion of late years. The start is usually made about the end of October or the beginning of November in a fine sailing vessel, and Melbourne or Wellington is reached in about three months. A month or two are spent on shore, and the return to England takes place by summer time.

With the kind help of my friend Captain Toynbee of the Meteorological Office, I have carefully perused the logs of several sailing vessels bound to and returning from these countries at various seasons of the year, and the following are the chief facts which bears on our subject. When a vessel leaves England in the beginning of October, the temperature ranges from 52 deg. Fahr. to 58 deg. Fahr. for the first five days. Off the Azores, it rises to 60 deg. Fahr. On passing the Canaries, it reaches 70 deg. Fahr. When the good ship crosses the Equator, the maximum, namely 80 deg. Fahr., is attained; but this, thanks to the wind always blowing, is not oppressive, or even unpleasant. The heat then moderates, and in 29 south latitude 70 deg. Fahr. is about the average; and, steering south to the Cape, it falls to 60 deg. Fahr. After rounding this, the temperature becomes for a time very uncertain, varying from 49.5 deg. Fahr. to nearly 60 deg. Fahr., the cause being the meeting of the cold currents from the Antarctic

Circle and the warm Agulhas current. These overlapping each other form a series of strata, which in places run side by side and affect the air considerably, causing changes in the temperature, which have to be met by many precautions on the part of invalids. The ship then reaches 45 south latitude, and steers due eastward, the thermometer ranging between 40 deg. Fahr. and 50 deg. Fahr., owing to the nearness of the Antarctic Circle. When 70 east longitude is attained, the temperature remains steadily above 50 deg. Fahr., and gradually rises to 66 deg. Fahr. on nearing the Continent of Australia. Thus, we see the degrees of warmth vary from 40 deg. Fahr. to 80 deg. Fahr.

I have not noted the course of the winds, for the vessel mainly sails before them, and the invalids are spared some of the discomforts of a head-wind which in steamers at times causes much annoyance.

Captain Toynbee tells me that observations on the hygrometer show that the difference between the wet and dry bulb varies from 2 to 5 deg., which, when we consider the high temperature of some portion of the route, is a very small one, and indicates a large amount of moisture to be present in the air; for we must remember that in the South of France, at the same period of the year, this instrument often shows a difference of 10 deg.

When the voyage is attempted in summer, the patient generally starts in May, arriving at his destination in August; and the thermometrical observations do not differ greatly from those of the October voyage. It is 62 deg. Fahr. off the Azores; 70 deg. Fahr. on nearing the Canaries; 85 deg. Fahr. on crossing the Equator; 70 deg. Fahr. on reaching 26 south latitude; 60 deg. Fahr. on rounding the Cape; and, after passing through the region of change and steering eastward, 50 deg. Fahr. is the average without any rise on reaching Melbourne, where the patient lands in midwinter.

Neither of these trips exposes the passengers to any great perils from vicissitudes of temperature; and, though the weather may be rough at times, he is generally on deck during the greater part of the day.

The return voyage from Australia or New Zealand is fraught with more dangers, as a study of more ships' logs and the histories of some of the patients show. This is because the course of the vessel lies past Cape Horn, and keeps farther south and nearer the Antarctic Circle than is done on the outward trip. A ship leaving Wellington in April, when the temperature was 55 deg. Fahr., for the first week enjoyed an atmosphere of 50 deg. Fahr.; and, when 50 south latitude and 137 west longitude was arrived at, it fell to 40 deg. Fahr.; and off Cape Horn to 38.40 deg.; and here it was that one of our cases lost ground by catching a fresh cold. For twenty-eight subsequent days, the thermometer ranges from a few degrees above 40 deg. Fahr. to a few degrees below this figure, the wind being south from the icy regions. This is assuredly a wretched state of affairs for our consumptives. In 40 south latitude, a rise to 50 deg. Fahr. is observed; in 35 south latitude, to 60 deg. Fahr.; and off Monte Video 70 deg. Fahr. is marked; at the line, 80 deg. Fahr. is recorded; and at the Azores it is about 70 deg. Fahr.; and the British shores are reached in mid-July warmth.

It is noticeable that the climate of the Atlantic and Pacific does not seem to vary much with the season, whether the voyage be undertaken in spring or in autumn, though it may make a great difference whether the invalid arrive at our antipodes in their midsummer or their midwinter; and again, the season when Cape Horn is rounded may be of great importance.

The less southward a vessel goes on the return voyage the better, as in very cold weather snow and sleet and hail are often encountered.

The average number of rainy days cannot be stated, as, of course, they vary with latitude and other causes; at least twenty should be reckoned on.

Of course, there must be a certain amount of monotony on boardship, with the same daily round of occupations and meals, only varied, it is said, by flirtations and by quarrels.

The beneficial effect on consumptive patients does not begin, according to Dr. Maclaren, for the first week or two; but, as the weather becomes warmer, the cough lessens, and the irritability of the system subsides. Improvement to the appetite soon commences, and the gain of weight is most apparent when the cooler latitudes of the southern hemisphere are reached. Dr. Maclaren is disposed to regard the influence of the voyage, before the south-east trades are encountered, as a sedative, but afterwards the tonic element in the form of the gradually cooling atmosphere and the strong fresh breezes predominates and continues until Australia is reached.

An invalid seated on the deck of a fine clipper built ship in a southern latitude, say 27° south latitude, is placed under some of the best hygienic conditions possible. He breathes the purest of air, experiences at any rate one form of passive exercise, without fatigue or fear of chill; he is supplied plentifully with good food in fair variety, for which he has an appetite outstripping even the continued succession of meals.

But when he retires to his cabin, and if he should be confined to it by bad weather or illness, the conditions are surely somewhat changed; he has to live in what, in his own house, would be considered a cupboard, and but a poorly ventilated one, or, especially when dirty weather requires the portholes to be closed, he is jolted about by every motion of the vessel, and not improbably is tormented by sea-sickness. It must be conceded that this view of the picture is not a cheerful one, and contrasts unfavourably with the quiet nights in lofty bedrooms which are obtainable in land sanatoria.

Mr. Lennox Browne's capital monograph on *Australia for the Consumptive* contains a valuable chapter of hints for the voyage: how to choose a cabin and make it comfortable, and avoid unnecessary disagreeables.

I will now give as illustrations two marked cases of benefit accruing from this form of climatic treatment.

A medical man, aged 37, consulted me in September 1868, complaining of cough and loss of flesh since February. He had been overworked in town practice, and nine weeks previously had hæmoptysis to the amount of a half-pint, followed by a smaller quantity a few days later. Night-sweats and loss of appetite came on, for which he was sent to Margate. I found more or less dulness over the whole right front, with absence of breath-sound and bronchophony in the lower fourth; tubular sounds were audible at and above the right scapula, with some crepitation under the clavicle. He was recommended to persevere with the cod-liver oil, which he had commenced taking, to use iodine locally, and make a voyage to Australia. He accordingly took an appointment as surgeon on board an Australian clipper, and spent two years in voyaging to and fro; during this period, his weight increased from 9 st. to 10 st. 12 lbs.; his cough greatly diminished, and he became well enough to resume his arduous town duties. In December 1874, he had congestion of the right lung; and in February 1875, he was examined by my father and myself, with the following result. Flattening and slight dulness were found over the upper third of the right chest; scattered crepitation was most marked in the mammary region. He had become quite stout and somewhat short-breathed, and complained not of cough or of pulmonary symptoms, but of intestinal disturbances, and asked our advice as to entering the holy estate of matrimony.

A gentleman, aged 21, consulted Dr. Williams in April 1861. Towards the end of the previous year, he had had an abscess near the rectum, which left a small fistula; and, after much anxiety during that winter, he suffered from pleuropneumonia of the left lung, which was treated by calomel and opium, salines, and repeated blisters. In June, the fistula was still discharging, and the patient complained of much loss of flesh and strength, with cough and purulent expectoration; also occasional occurrence of pain in the left side. The physical signs were dulness, deficient motion and breath in the lower two-thirds of left chest; loud bronchophony at and within the left scapula; crepitus on deep breath. He was ordered cod-liver oil, with nitric acid tonic; a saline with opiate at night, and a blistering liniment to the side. In November, he had rapidly improved and gained flesh; but the cough, which for some time he had lost, had returned, and the fistula was still open. Coarse crepitation was now to be heard in the left back, with cavernous sounds over the scapula, although the general dulness had slightly diminished. The treatment was continued, and he went to Madeira for the winter, which he passed pretty well, although once, after fast riding, he spat three ounces of blood; and in April, after catching cold, the cough and expectoration increased. He took the oil regularly, and did not lose weight. In May 1862, Dr. Williams found still much dulness and obstruction in left chest, with obscure cavernous sounds in scapular regions, and large tubular sounds above right scapula. That autumn, he took a longer voyage, and passed the winter in Natal and Capetown, returning in the spring *via* Brazil. He continued his treatment, became quite free from cough and expectoration; and, when seen in June 1863, was in good flesh and strength. Still he had slight discharge from the fistula. The signs of cavity were more obscure, and some improvement in breath and percussion-sounds were detected.

He spent the ensuing winter on the sea, leaving in October for Australia; and, after one month there, returned home, reaching England in May, and was able to report of himself that he had gained seven pounds in weight. With the exception of slight hæmoptysis at Capetown, he had been quite well the whole time; examination also showed improvement, viz., only loud tubular sounds at the left scapula; some breath-sound, weak in some parts, and rough in others on that side. However, he continued his voyages, and again spent two winters on the sea; the first to the Cape and Bombay, and home; the second to Australia and back, still persevering with the oil; and in general health he quite recovered. In May 1866, Dr. Williams found that the

patient had gained five pounds; the left chest was still rather duller than the right, and somewhat contracted. Tubular sounds were heard at the scapula; there was a peculiarly dry vesicular breath-sound below, on full inspiration, indicating flaccid emphysema.

He went one more voyage to the Cape as a precaution, but continued in good health, stouter and stronger than ever; and the fistula, though still open and discharging a little, gave no inconvenience. He took oil occasionally; and, when seen in May 1868, was considered by Dr. Williams to be quite recovered, and he had spent the last winter in London without harm. Some years afterwards, he was reported by his friends to be still quite well, having been for eleven years under observation.

According to our list, in point of benefit received by the patients, sea-voyages occupy the first rank, the very dry climates the second, the south of Europe dry climates the third; then follow the moist climates, Rome being fourth, Madeira and the Atlantic warm climates fifth, and at the bottom of the list comes Pau.

Let us see whether any great difference existed in the nature of cases sent to each sanatorium, and examine the table showing the relative conditions of the lung of each group of patients.

Relative Conditions of the Lungs in 251 Patients wintering in Foreign Climates.

	First Stage.	Second Stage.	Third Stage.	Both Lungs.
Pau	52.20	34.00	13.60	38.63
Madeira	62.85	20.00	17.14	40.00
Rome	72.22	16.67	11.11	38.69
South of Europe ..	58.55	20.38	21.05	35.53
Egypt, Cape, etc. ..	62.05	27.58	10.34	40.68
Sea-Voyages .. .	72.22	11.11	16.67	27.78

We see that, as regards number of first-stage cases, Rome and sea-voyages were the best, Madeira and Egypt came next, the South of Europe followed, and Pau had the fewest. In percentages of second and third stages, Pau was the worst, the South of Europe the second, Madeira and Egypt about the same (as in the first-stagers); and the most favourable were Rome and sea-voyages, with similar percentages.

Now we come to the question of double affection; and we find that both lungs were affected in 40 per cent. of the Madeira patients, in about 38 per cent. of the Pau and Roman ones, in 35½ per cent. of the South of Europe invalids, in 27¼ per cent. of our sea-voyagers, and in only 20 per cent. of the Nile travellers. There appears from this to have been more bilateral affection in the moist land climates than in the dry ones. In point of stage, the cases sent to Pau were slightly the more unfavourable; then came those of the south of Europe, Madeira and Egypt following at a considerable interval; and, lastly, as the most favourable, were the Roman and sea-voyages cases.

Viewing the patients in both aspects (stage and bilateral affection), we may conclude that the Pau patients were slightly the more unfavourable, and the voyage ones decidedly the most favourable; but, as regards the others, there was no great difference; the South of Europe cases closely resembling the Madeira ones, and being less favourable than the Roman. Thus, beyond vindicating in a slight degree the character of Pau, and pointing out that the sea-voyages were tried under favourable circumstances, our examination of this table does not modify our verdict with reference to the respective merits of dry and moist climates; and we are bound to conclude that, for the ordinary forms of consumption, a dry air, whether inland or marine, is better than a moist one, inland or marine, cold or hot.

Before closing my inquiry, I examined the patients at each sanatorium, according to the origin and nature of the disease; and I found that phthisical cases of inflammatory origin did better in the South of Europe than at Pau or Madeira; on the other hand, as regards those of catarrhal origin, Madeira was the most favourable, the South of Europe the next, and Pau the worst. The scrofulous patients seem to have done fairly well in all climates, and not, as might have been expected, to have profited more by a marine than by an inland air.

Now, from this tangled web of figures which I have woven round you, I would draw out a few clear rules as to the climatic treatment of consumption.

First: Which patients ought to winter abroad, and which may equally well remain at home?

Secondly: What cases are most benefited by sea-voyages?

Thirdly: What patients profit most by dry climates, and how far ought the temperature and elevation to be taken into account?

Fourthly: Are moist climates, whether hot or cold, desirable at all for consumptive patients?

1. If a phthisical patient in any stage can take a fair amount of exercise without contracting fresh lung-irritation from exposure to meteorological changes, and if he have a good appetite, with diminishing cough and increasing weight, I should unhesitatingly advise him to remain at home, and trust to treatment and to the food of the best dietary in the world—that of Old England. If, however, he cannot take exercise without constantly catching cold; and if, when confined to the house, he lose appetite, become low-spirited, pine for fresh air, sunshine and change of scene; and, above all, if the confinement act unfavourably on the digestive organs, causing bilious derangements and disinclination to the cod-liver oil, equally unhesitatingly I advise a trial of another climate, if the strength permit. There are a number of consumptives who profit more by food than climate, and never seem to thrive except on British fare. These had better stop at home, and try the sunshine of the south coast.

All cases deemed *advanced*, whether because of extensive tubercular consolidation of both lungs, or because of considerable excavation of one or of both lungs, and cases of active tubercular disease; or, again, those manifesting great irritation of the pulmonary or of the gastric mucous membrane, had better remain in England, as change of climate will not yield them a sufficient return for the alteration of food, life, and habits, as well as the risk of the journey.

Nevertheless, these are often the patients who are most anxious to winter abroad; and even when at death's door, they will not give up their hope that in another and a sunnier clime new life may be vouchsafed to them.

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

2. As regards the second point, be it remembered that a sea-voyage is a long and trying experiment, to which the invalid has to submit when once he embarks, whether it suit him or not, for several months. In the trip to Australia, there are few halting places, and a patient may die before reaching them. Then, again, the element of sea-sickness must be borne in mind, though, fortunately, consumptives appear to suffer less than other people; and there is also the chance of the invalid being confined to his berth in case of severe attacks. All these considered, and remembering the character of our patients who profited by the voyages, we must be very cautious in recommending their use, and as much consultation and deliberation should precede a decision as is given by surgeons to a life-or-death operation.

The cases which I have seen do best are, first, cases of hæmorrhagic phthisis; second, cases of limited consolidation with no pyrexia, occurring in young men overworked at in-door occupations, and who have suffered from the septic influences of life in great cities, such as clerks, shopmen, secretaries, and the like. This form of treatment is far better suited for men than for women.

3. As to the third query, as to what class of patients profit most by dry climates, it has been shown that, taking collectively all forms and degrees of phthisis, the dry climates are the most likely to arrest the disease; and also that a dry and moderately warm climate, like that of Southern Europe, is most successful in the treatment of consumption of inflammatory origin. The question whether a cold dry, or a warm dry atmosphere is the best for ordinary chronic phthisis, depends to a great extent on the individual's power of maintaining circulation and temperature. When these suffice, the cold climates are preferable; but in the majority, and especially for women, whose circulation is weaker, the warm and dry are the best, for they are thus enabled to live more in the open air. Elevation is of some importance; and I should always choose a mild climate with elevation than one without it. Mountain-air is not beneficial solely on account of its purity, for on this point sea and desert air may vie with it; there is another factor in the low barometric pressure and atmospheric rarefaction, and the expansion of the lungs thereby caused may be of great value in chronic first-stage cases. At present, the trial of mountain climates must depend on the supply of suitable accommodation and food for invalids. If in the Andes sanitaria these articles were of a nature fit to offer to our comfort-loving British consumptives, I would not hesitate, after the evidence of Archibald Smith, Walshe, and others, to recommend them, as some can also boast of a warm winter temperature; but, alas! those who repair thither at present, must be content with Spanish habits, Spanish food, and an unsettled government. The Alpine elevated sanatoria do not, according to my experience, supply in winter sufficiently good food for British consumptives; and, although they attract crowds of Germans and Swiss, they must not expect our countrymen in equal numbers until they feed them properly.

4. As to the desirability of moist climates for consumptive pa-

tients, the evidence is decidedly against their use in the treatment of ordinary chronic phthisis. The addition of warmth only makes the damp tell more unfavourably, though a strong saline element and invigorating breezes do something to counteract the humid influence; still even these do not place a moist climate on the same level as a dry one. There is one exception, however. Phthisis, of catarrhal origin, has been shown to profit most by a warm and equable climate, even though accompanied by a certain amount of moisture, as the evidence of Madeira witnesses.

Finally, in all climate questions, full note must be taken of the patient's inclinations, means, and, above all, of his disposition and temperament; and exile must not be decreed to those who are incapable of making themselves happy under the changed conditions of life, or all our scientific grounds for a climate decision may collapse like a house of cards.

Climate is only one portion of the system of attack which we organise against the dread foe which decimates our population, and would be worth little if not combined with medicine and hygiene, and a determined will to wrestle bravely against the home-thrusting enemy.

A REJOINDER TO DR. TYNDALL'S REPLY ON THE DEVELOPMENT OF GERMS IN INFUSIONS.

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PROFESSOR TYNDALL'S article in the JOURNAL for February 12th contains certain misrepresentations of too serious a nature to be allowed to pass without correction.

I cited a number of investigators who had obtained evidences of fermentation or putrefaction in previously boiled organic fluids exposed to purified air. It is the occurrence of this fact which Professor Tyndall, from the basis of his own experiments, denies. Now, amongst the authorities whom I cited, there were some who regarded the appearance of bacteria under the conditions specified as evidence in favour of so-called "spontaneous generation", whilst others of them explained such results on grounds which are as various as they are mutually contradictory. To enter into the reasons or interpretations would have required too much space—it was moreover unnecessary, as this had been fully done elsewhere. It was the fact itself, of the occurrence of living organisms under these conditions, which had been denied by Professor Tyndall.

In citing Schwann, I did not for one moment suppose it was not known that the interpretation he had given of his experiments was adverse to the occurrence of a "generatio æquivoca". The readers of the JOURNAL were, therefore, perhaps not so deeply moved as Professor Tyndall represents himself to have been by the discovery that Schwann did not attach very much importance to the experiments in which he obtained positive results. In his excitement on this subject, moreover, Professor Tyndall omitted to mention one important point; viz., that the positive results alluded to were obtained with a different kind of fluid from that which Schwann had previously employed in the experiments, the details of which are given by Professor Tyndall. In these latter experiments, Schwann worked with an infusion of meat, and his results were, truly enough, uniformly negative in character. But in operating with a different fluid—viz., cane-sugar mixed with beer-yeast—the results became contradictory, being sometimes negative and sometimes positive. Although Schwann fancied that the positive results referred to might be easily explained (and, be it observed, this is a matter of interpretation), he nevertheless, like a good experimenter, did not regard the matter as wholly settled. The very note from which Professor Tyndall quoted (*loc. cit.*, p. 188) ends with the following reference to the question of the interpretation of the above mentioned experiments. Schwann says: "The matter can, however, be decided by another more certain method." In further support of my position that these positive results were not accounted for by Schwann in a manner which is free from doubt, I need only quote from one who is opposed to me on the question of the interpretation of such experiments generally. In the historical summary with which he prefaced his celebrated memoir of 1862, M. Pasteur says (*loc. cit.*, p. 15), in reference to the experiments of Schwann, that, though his experience in relation to the putrefaction of meat-infusion was "très-nette", as regards the alcoholic fermentation, "les expériences du savant physiologiste étaient contradictoires".