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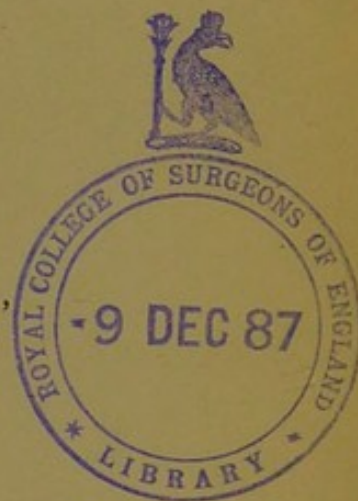
INFLUENCE OF THE ALPINE CLIMATES

ON

PULMONARY CONSUMPTION.

BY

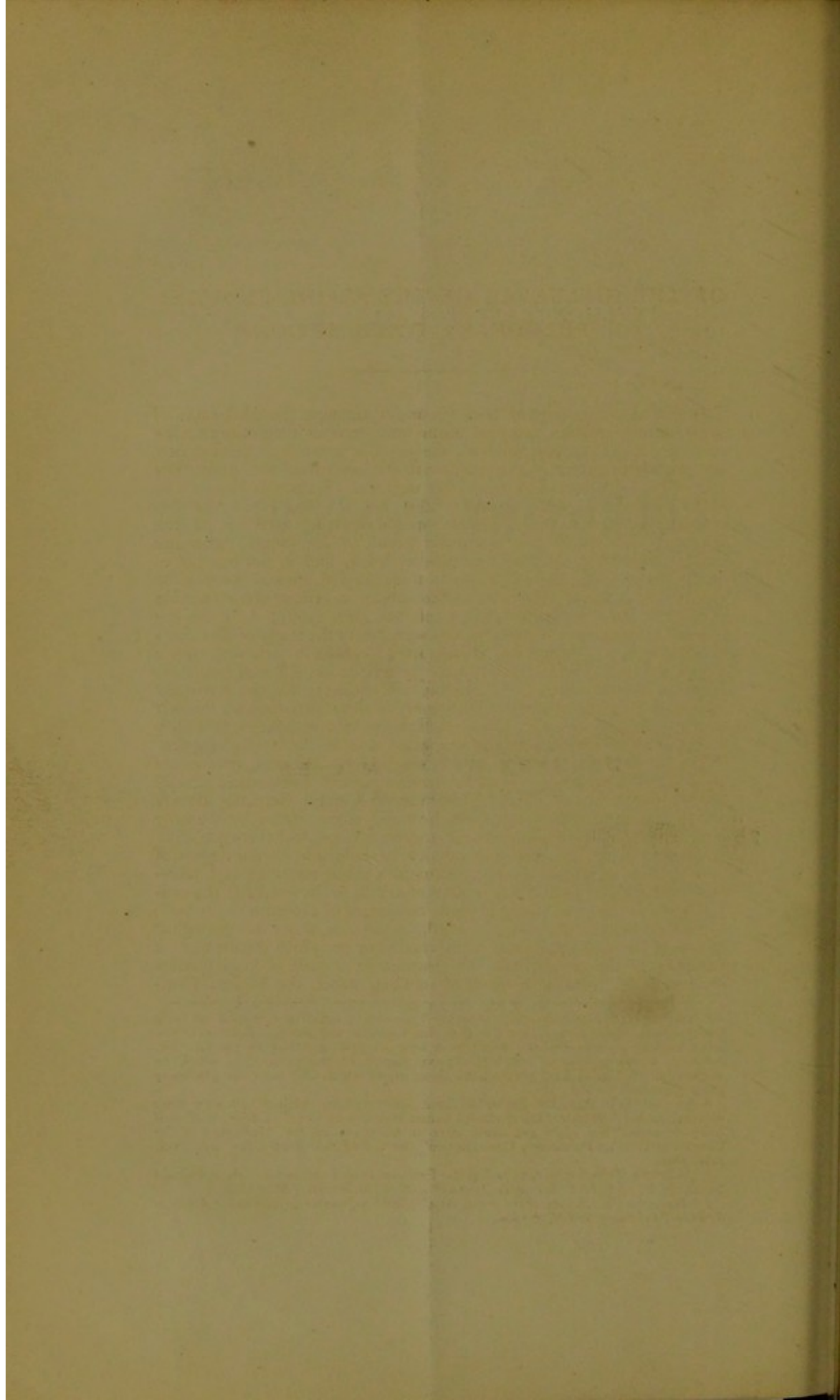
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MDCCCLXVII.



ON THE INFLUENCE OF THE ALPINE CLIMATES ON PULMONARY CONSUMPTION.*

THE fact that consumption does not occur amongst the inhabitants of some elevated regions is by no means new; nor is it unknown to the profession that, in some countries, the practice prevails to remove persons manifesting signs of consumption from lower localities where they have been thus attacked to higher regions. I should occupy too much space if I were to enter fully into the history of this interesting question; but I cannot forego directing attention to the important labours of Dr. Archibald Smith of Edinburgh, who has availed himself of his long residence in Lima, and in various places of the Peruvian Andes, practically to study the influence of the Andine climates on phthisis. He refers to this subject in various of his valuable papers on the Diseases of Peru,† and has quite lately‡ done me the honour to reply to an appeal for co-operation in the study of this question. § Lombard, Mühry, and Hirsch, have likewise, in their well known works, very ably treated the subject. Jourdanet has adduced important facts for Mexico, Fuchs for Germany, and Schnepf for the Pyrenees, especially for Eaux-Bonnes. The degree of elevation necessary for producing a certain degree of immunity seems to vary in different latitudes, and appears to be lower in the temperate than in the tropical regions. While, in the latter, phthisis may be regarded as becoming rare above 7000 feet, the frequency diminishes in most parts of Switzerland already above 3000 feet, and in the mountains of Central Germany already above 1400 feet. Elevation alone, however, seems not to be the only point of influence, even in the same mountain range; but there are other circumstances which assist or counteract its influence, as the degree of motion in the atmosphere; the situation of a place, either on high tableland, or on the top or on the incline of a hill, or in a valley; the configuration of the surrounding ground; the degree of exposure to the sun's rays; the aspect to the south, or north, or east, or west; the geological nature of the substratum and other conditions on which the dryness or dampness of the soil depends; the nearness or absence of large glaciers or snowfields, or lakes, or sheets of standing water; the habitual clear-

* The old term, "pulmonary consumption", is used in order to comprise not only "tuberculosis of the lungs", but also the other subacute and chronic affections of the lungs leading to consumption, which have been so well described by the late Dr. Addison, in his admirable but little known papers on the subject, in which he already, in 1838 and 1845, propounded those views which only now are gradually gaining ground.

† As early as in 1840, Dr. Archibald Smith discussed the subject in a very clear manner, in his "Practical Observations on the Diseases of Peru" (*Edinb. Med. and Surg. Journal*, No. 144); and again later, in his paper on the "Influence of the Climate of Peru on Pulmonary Consumption" (*Brit. and For. Med.-Chir. Rev.*, vol. xviii, 1856).

‡ "Climate of the Swiss Alps and of the Peruvian Andes compared." By Archibald Smith, M.D. (*Dublin Quarterly Journal of Medical Sciences*, May 1866.)

§ "Notes on the Climate of the Swiss Alps" (*Dublin Quarterly Journal of Medical Sciences*, February and May 1864).

ness or mistiness of the atmosphere; the number of clear or rainy days; the quantity of rain and snow; the degree of humidity of the air; and many other circumstances, no doubt, exercise some influence. As the Swiss Society of Naturalists has appointed a committee to inquire into the occurrence of consumption in the various parts of Switzerland, and as the same Society has meteorological stations all over the country, it may be anticipated that gradually some of the circumstances influencing or counteracting the occurrence of consumption may be elucidated.

As it has been repeatedly shown that consumptive diseases, in their earlier stages, are favourably influenced by the removal of the patient to higher elevations, it appears surprising that this plan of treatment has been almost entirely disregarded by the medical men of Europe. I will, therefore, shortly discuss the principal objections met with in conversation with men of deservedly high reputation in our profession.

1. The low temperature and the roughness of the Alpine climate during the greater part of the year are usually regarded as hostile to the delicate constitution of the consumptive patient. Cold, however, is in itself surely no cause of phthisis, which, in some of the most northern parts, is rarer than in the South of Europe. The popular prejudice against cold may, perhaps, be understood, by considering that cold induces delicate people to remain indoors, and keep their doors and windows closed, and that it often prevents the poor from gaining their livelihood; that it, therefore, gives rise indirectly to the most powerful causes of consumption; viz., confinement in ill-ventilated rooms, insufficient exercise and imperfect breathing, scanty clothing, and want of proper food. With more reason we might say, that cold in itself counteracts the tendency to consumption where there is a sufficiency of food and clothing, for it causes an increased abstraction of heat from the body, to supply which the respiratory action must be proportionately increased and the expansion of the lungs promoted, which latter is one of the greatest prophylactics against consumption.

2. A second objection often raised is, that the rarefied air of elevated localities increases the tendency to hæmoptysis. It probably owes its origin to the description of great ascents by Saussure, Humboldt, and others; but these climbers were in conditions very different from those of the invalid gently walking about near his temporary mountain residence. Those who have ascended high mountains, and especially steep snow-slopes, without being in thorough training for such work, will remember the violent beating of the heart and the throbbing of the carotid and temporal arteries, which might, one should think, easily lead to rupture of the weak vessels; yet, how rarely such a rupture actually does occur, how seldom any bleeding from the nose or mouth takes place, all those can testify who are in the habit of spending their holidays on the Swiss mountains. Some of the famous guides who constantly accompany the great Alpine climbers tell us that they have rarely, others that they have never, seen those much talked of bleedings, either in their fellow-guides or in their enterprising patrons. It may, therefore, be concluded that this supposed effect of rarefied air has been much exaggerated; but, even if it were to occur amongst active climbers, this ought not to deter the quiet invalid sojourning in elevated valleys. One of the most frequent causes of pulmonary hæmorrhage is probably the rapid breaking down of lung-tissue, and through this the lesion of blood-vessels before they have been obliterated; and circumstances favouring such a process are likely to increase the tendency to pulmonary hæmorrhage, while those unfavourable to it diminish the tendency; and I trust that such an influence may sooner or later be accorded to well selected Alpine climates.

But, apart from reasoning, let us see what experience teaches. Dr.

Archibald Smith, after having mentioned that hæmoptysis is very common in Lima, says: "Climate is supposed to be omnipotent in the cure of hæmoptysis—*i. e.*, the removal to the temperate recesses among the hills."* The recesses referred to are about 9000 feet to 10,000 feet above sea level. Again, he says, in another place: "Incipient tubercular phthisis, usually attended with more or less hæmoptysis, is one of the most common pulmonary affections known in Lima and other parts of the coast of Peru. It is a disease almost certainly curable, if taken in time, by removing the coast patient so attacked to the open inland valley of Jauja, which runs from 10,000 to 11,000 feet above sea-level."† My own experience is limited; but, amongst the invalids in whom I have been able to watch the influence of Alpine climates, there were five who, while living in low elevations, had suffered from one or more attacks of serious hæmoptysis, and all of them remained quite free during their stay in Alpine regions.

3. A third objection often raised is, the great difficulty of finding a proper mountain residence for the invalid; and this, I must confess, is not without foundation. It is impossible for an invalid in a changeable climate to live without a proper house and food, and some comforts; and it is almost impossible for him to live without society, occupation, and amusements. On the mountains of Great Britain there are, as yet, no such homes for invalids; but, in the British colonies, on the Himalaya range, there are probably many already well inhabited localities where consumptive invalids might regain their health, where the British army might have its sanatorium for the consumptive soldier. In South America, the Peruvian Andes offer many eligible situations, and especially, according to Dr. Archibald Smith, the two principal health-resorts for the phthisical invalids from Lima, Jauja and Huancayo, where the climate is temperate and equable, the sunshine bright, and fogs very rare. With the increasing facilities of communication, these Andine sanatoriums for the consumptive will become more and more accessible. The high table-land of Mexico, too, may offer many eligible localities, when once the social conditions of that country have become more settled.

In Europe itself there were up to quite lately no arrangements for the wintering of delicate persons in elevated situations; but it possesses several localities well adapted to the purpose; and in some of the valleys of the Grisons there are not only villages and inns to live in, but also trustworthy medical men to superintend the invalids. One of these valleys is the Upper Engadin, which is already well known to the profession as a summer residence, but is almost equally well suited for the reception of invalids during winter. Another but much less known valley is the Davos, at an elevation varying from 4,500 to 5,100 feet above the sea-level. It runs about eleven miles in length, parallel to the Engadin, but in the opposite direction, *i. e.*, from north-east to south-west, and is traversed by a stream called the Landwasser. Few of the mountains which border the valley on both sides exceed nine thousand feet in height, and most of them take their rise in a comparatively gentle slope, thus admitting the rays of the sun during the greater part of the day; and nowhere in the upper portion of the valley is that sense of oppression felt which dwellers of open countries often perceive in mountainous countries. The geological substratum of the valley is principally gneiss with hornblende and mica-slate; the crests on the right side of the valley consist of various formations of limestone and dolomite, which descend on some places into the valley itself, as in the neighbourhood of Davos am Platz. There are no glaciers and

* "Practical Observations on the Diseases of Peru," *l. c.*, p. 8.

† "Climate of the Swiss Alps and Peruvian Andes compared," *l. c.*, p. 349.

large snowfields in the neighbourhood, a circumstance which, though it takes away from the grandness of the scenery, increases the value of the locality as a health resort, as being less subject to those icy winds descending from glaciers and extensive snowfields. The principal village is Davos am Platz, about 5,100 feet above the sea, with two good inns situated still on the slope of a hill facing the south. Two excellent medical men reside there, Drs. Spengler and Unger, who devote themselves particularly to pulmonary affections, and keep accurate notes of the progress of the cases under their charge. Dr. Unger, to whom I am indebted for much valuable information, himself had a cavity in his right lung when he first resorted to mountainous climates, and now, after a lapse of four years, is not only free from cough, but is also able to undergo considerable bodily exertion. The population of the valley, especially the male, has the appearance of robust health, with the broad shoulders and wide chests peculiar to mountaineers; and the locality has for many years past enjoyed a good reputation for its influence on scrofulous diseases.* I am not yet provided with accurate meteorological observations, but they are being made by Dr. Spengler. The winter is, of course, cold; but this cold is not excessive, and appears to be rather less than in some lower localities of Switzerland, owing principally to the fact that the valley is protected on the north and north-east. The number of clear days is comparatively great in autumn and winter, in fact greater than in summer; and, owing to the configuration of the locality, the rays of the sun have access during the greater part of the day, and their force in the rarefied air is so great as to allow the invalid on fine winter days to sit in the open air or at the open window.

With regard to the diseases prevalent in the Davos, there are, according to Dr. Spengler's experience extending over more than twelve years, no endemic diseases. Pneumonia is the most frequent of the more serious affections, but it terminates in general favourably on the seventh day without active treatment; the lower lobes are those most usually affected, but occasionally the disease occupies the upper lobes; the termination in consumption seems to be unknown. Chronic bronchitis and emphysema are not rare, but are probably less frequent than is usually believed. Croup is a comparatively frequent disease, especially in spring. Rheumatic affections and diseases of the heart are frequent; and not less so various forms of dyspepsia, and chronic affections of the stomach, especially the round ulcer. The mortality of children is small. Scrofulous diseases originate very rarely in the valley, and those introduced from abroad are favourably influenced by a prolonged residence. Dr. Unger especially mentions the entire absence of tubercular diseases of the lungs among the natives who have never left their valley; and Dr. Spengler perfectly corroborates this statement, and has also mentioned to us cases of men who had become consumptive while working abroad, and have regained their health by a timely return to their native home. Dr. Brügger, it may be remembered, has made the same statement with regard to the neighbouring valley of the Upper Engadin; and Dr. Boner of Klosters likewise states that, in the upper part of the Prättigau, immediately adjoining the Davos, although below the level of 4,000 feet, he has not met with consumption; while it has repeatedly occurred to him in the lower part of the same valley.†

The absence of consumption and scrofulous diseases among the inhabitants of the valley who have never left their home, the influence

* Dr. Meyer Ahrens, "Die Heilquellen und Kuroerte der Schweiz." Zurich, 1860, p. 702.

† I owe this statement of Dr. Boner's experience to a communication from Dr. Unger of Davos am Platz.

exercised on these diseases, when the natives have acquired them during their stay in other localities, by a timely return to the valley, and the usually favourable termination of pneumonia, are important facts in recommendation of the curative influence of such mountain valleys in scrofulous and consumptive diseases—facts which cannot be urged in the same manner for other localities greatly in favour with the profession and the public. I can, however, not deny that there are also disadvantages connected with a prolonged stay in these mountain regions, especially the want of the habitual society and healthy excitement, and of the accustomed comfort. I do not undervalue these disadvantages, which to some invalids are most serious drawbacks; but, if it could be proved that, in a certain class of cases, the curative influence is much greater than in the usual and more agreeable health-resorts, the profession would sooner or later declare in favour of the elevated regions, and the present disadvantages would thereby gradually be much lessened. I shall, for this purpose, give an outline of those cases which have particularly influenced me in forming a favourable view, and then add a short abstract of the observations made by Drs. Spengler and Unger at the Davos.

CASE I. J. H., aged 24, a clockmaker from the Black Forest, who formerly had enjoyed good health, came to England in the summer of 1848. He had repeated attacks of sore-throat and bronchitis in the same and in the following winters, and became an out-patient of the German Hospital in the summer of 1851, with cough and dyspeptic symptoms. He had slight dulness and impaired respiration in the right clavicular and infraclavicular region; and, with slight variations, gradually lost weight up to September 1852, when he was seized with bronchopneumonia of the lower part of the left lung, slowly creeping upwards, until, in the beginning of November, the dulness reached on the back up to the upper third of the scapula; the crepitant rhonchus having ceased in the lower portion of the dull space, but being persistent in the upper. On the right, the originally diseased side, the dulness extended from the apex to the fourth rib, and was accompanied by a slight degree of bronchophony and large-sized rhonchi. There was great emaciation; pyrexia every evening, followed by perspiration towards the morning. Pulse 110 to 120; and chest-expansion 33 to 34½ inches. In this condition he returned to his home in the Black Forest, about 2,800 feet above the sea-level; where, after some weeks, on milk diet, he gained strength, lost the night-perspiration, and gradually also the cough. In July 1853, when he returned to London, nothing abnormal could be discovered on the left side. The upper part of the right was considerably flattened; but the dulness extended only from the apex to the second intercostal space; the bronchophony was replaced by absence of vesicular murmur and prolonged expiration; and there were no rhonchi. Pulse 82; chest-expansion 34½ to 36½ inches; increase in weight, 21 lbs. He remained well up to August 1854, when he again began to cough; not long after which, while at work, he was seized with violent hæmoptysis, and died on the fifth day.

Post Mortem Examination. The upper lobe of the right lung was adherent; the apex hard, contracted, consisting entirely of slate-coloured, dense, fibrous tissue, almost grating under the knife. The lower part of the same lobe was expanded, as in emphysema. The two other lobes were free from old disease; but several bronchi were plugged up with coagulated blood. The left lung was everywhere adherent. In the centre of the upper lobe was a small fresh cavity filled with blood, with grey soft infiltration in its neighbourhood. In various parts of both lobes were apoplectic nodules; several bronchi were filled with

decomposing coagulated blood. The heart was fatty. The liver was likewise slightly fatty. The kidneys were congested.

This case, which evidently was one of Addison's pneumonic phthisis, is of great interest, not only on account of the rapid recovery after the patient's return to his mountain home, but also on account of the relapse and fatal termination after the too early return into unfavourable conditions; and, further, on account of the light thrown upon the nature of the affection by the result of the *post mortem* inspection.

CASE II. J. K., aged 22, a native of Switzerland, formerly healthy, came to London in 1849, and was employed as a waiter in a City dining-room. He began to cough in 1850, and had hæmoptysis in February 1852. Dulness and rhonchi extended from the right apex to the third rib. There was increase of cough and pyrexia in July. Pneumonic affection of the lower part of the left side was discovered in August. The dulness and crepitant rhonchi gradually ascended to the suprascapular region on the left side (in November); and the older affection of the right side had much extended. The patient was never entirely free from fever. Loss of weight, 30 lbs. in eight months; pulse 90 to 95; respirations 30 to 36; expansion of chest, $34\frac{1}{2}$ to $35\frac{1}{2}$ inches. In this condition he returned home in November to an elevation of about 5,000 feet; and there, on an almost pure milk-diet, he gradually improved, and came back to London in May 1853, having gained 24 lbs. The left side appeared normal; the upper part of the right was sunk in; but there were no rhonchi, and the dulness and defective breathing extended only to the second rib. Pulse 75; respirations 14; expansion of chest, 35 to $37\frac{1}{2}$ inches.

He remained well until March 1855, when he contracted bronchitis, followed by pleuropneumonia of the right side, beginning at the apex, and extending rapidly downwards. In June, the upper part of the left side became likewise affected. Death ensued at the end of this month, from hæmoptysis.

Post Mortem Examination. There were extensive adhesions on both sides. The upper lobe of the right lung was much contracted and puckered; the apex was occupied by several chalky concretions, surrounded by dense, fibrous, slate-coloured, airless tissue. The remainder of the right lung was in a state of soft grey infiltration, with several fresh irregular cavities. The apex of the left lung was in a similar condition; but the greater part of this lung was permeable to air; it contained many hæmorrhagic spots. There were no miliary tubercles. The heart was fatty. The kidneys were in the first stage of Bright's disease.

This was again a case of Addison's pneumonic phthisis, occurring under the influence of confined air in a youth accustomed to pure mountain air. Great improvement or cure was produced by a prolonged stay in his native mountain climate—an improvement which continued for some years after his return into unfavourable hygienic conditions. At last, however, a fresh attack of catarrhal pneumonia led to rapid breaking down of tissue, the formation of cavities, and death accelerated by hæmoptysis.

CASE III. H. F., aged 31, a German, came to London in 1852, had a chronic cough in 1853, and hæmoptysis in the summers of 1854 and 1856. He spent then seven months in Cairo, where he became better, without, however, entirely losing his cough. He had again hæmoptysis in March 1857 in Cairo, and much cough during the summer of 1857 in London. There was improvement during the following winter at Cannes and Nice; but he was much worse after his return to London. He was first seen by myself in July 1858. He had lost 29 lb. in three years. There was dulness on the left side from the apex to the fifth rib, with bronchophony and crackling rhonchus in the supra- and infra-clavicular

spaces; and an analogous condition on the back of the same side. Nothing abnormal was discovered on the right side. He had shortness of breath. Pulse 85; thoracic expansion, 35 to 36½ inches. He went to Valparaiso, and had there again hæmoptysis. He spent then eight months on the Peruvian Andes (at an elevation of between 9,000 and 10,000 feet), and gained flesh and lost cough. He went afterwards to New Orleans, where he again began to cough and lose flesh. He was sent thence to the table-land of Mexico, where, to his own feeling, he entirely recovered his health. When seen by me in the autumn of 1860, the dulness on the left side reached only from the apex to the third rib. This portion was much flattened; and there was absence of vesicular breathing, but no bronchophony, and no rhonchus. He had gained 24 lb. in twenty-seven months. Pulse 66; expansion of chest, 36 to 38 inches. He remained well until the spring of 1866, when he again began to cough, was often feverish, lost much flesh, and had some hæmoptysis. When seen in the beginning of October 1866, the old affection of the left side had remained almost unchanged; but on the right there was dulness from the apex to the fourth rib, with bronchophony and occasional crackling rhonchus in the subclavicular space. He had lost 20 lb. in twelve months. Pulse 95; chest-expansion, 35½ to 37 inches. He went to the Valley of Jauja, in the Peruvian Andes, and lost his cough almost entirely; and, when seen in June 1867, he had gained 15 lb. The dulness descended on the right side only to the second rib. There was no rhonchus, but scarcely any respiratory murmur over the dull space. Pulse 74; expansion of chest, 36 to 38 inches.

The rapid improvement repeatedly obtained in this case by the removal to elevated regions is very striking; and it is also important to remark, that the improvement effected by the stay at Cairo and in the South of France was neither so great nor so lasting as that from the mountain sojourn.

CASE IV. B. D., from the lower parts of Switzerland, came to London in 1864, aged 22. He was much depressed by the fogs and dulness of the atmosphere. He had repeated attacks of bronchitis during the winter; and in the spring of 1865 he coughed, and became emaciated during the summer. There was slight dulness in the left clavicular and infraclavicular region, with diminished respiratory sounds. He spent the winter at Bordeaux and at Cannes; he never lost his cough entirely, and continued to lose weight. He returned to London in May 1866. Dulness extended on the left side from the apex to the third rib. He had, early in June, an attack of sore-throat, which was with him the usual forerunner of bronchitis; he became feverish, and by the end of the month a pleuropneumonic affection was ascertained in the lower part of the right side, which gradually crept upwards to the upper third of the scapula. By the end of July, the pyrexia had almost ceased, under a treatment of milk, quinine, and cod-liver oil; but the dulness over the back of the right side had not yielded. There was crepitant rhonchus over the upper part of the dull space, and absence of respiratory murmur over the lower; pulse 92 to 100; expansion of chest, 31¼ to 33 inches. The dyspnoea was great at every exertion; frequent cough, with about two and a half ounces of mucopurulent expectoration. He had lost 27 lbs. in as many months' stay in London. In this state he went, towards the end of July, to the Righi (Kaltbad and Scheideck), lived there almost entirely in the open air, and drank about two quarts of milk every day. In less than six weeks, he was able to take considerable walks; and in October he had lost his cough almost entirely. He spent the winter in different parts of Switzerland, usually above 2,500 feet above the sea-level. He had not a single

attack of sore-throat and bronchitis; and when he returned to London, towards the end of May, the right side was quite normal; the left side was in front, in the supra- and infra-clavicular spaces, slightly sunk in; there was moderate dulness and scarcely perceptible breathing from the apex to the second rib. He had gained 19 lb. in weight during ten months, and felt in every respect perfectly well.

CASE V. B. K., aged 21, had pneumonia of the right side about ten years ago. He came to London in spring 1865, and began to cough and lose flesh in the winter 1865-66. Hoarseness supervened in spring 1866, and the cough gradually increased. When seen in July, he was thin and pale, with circumscribed red cheeks; he had chronic swelling of the tarsal portion of the eyelids; pulse 105 to 110; respirations 26 to 30; temperature every evening slightly increased. There was fresh pneumonic affection of the lower part of the left side; dulness and absence of respiratory murmur on the right from the apex to the third rib. The evening pyrexia gradually subsided under perfect rest and milk diet; but the pneumonic affection slowly crept upwards, the dulness extending on the posterior part of the left side from the bottom to the upper third. When he left England towards the end of August, there was crepitation with slight bronchophony over the greater part of the left scapula; and the older affection of the right side had remained unchanged. He was advised to go to the Davos, but went first to Germany; and only after having been attacked by fresh colds he repaired in November to Davos am Platz, where he stayed until the middle of April, and, in spite of a rather unfavourable winter, entirely lost his cough, and gained 7 lbs. in weight; and the spirometer showed an increase of pulmonary capacity amounting to more than 900 cubic *centimètres*. According to Dr. Unger's report at the time of A. B.'s departure from the Davos, nothing abnormal could be discovered on the left side, except, perhaps, slight dulness in the lowest part; and the dull space on the upper portion of the right side was likewise diminished. In addition, the affection of the eyelids, which had existed for several years, had entirely disappeared without remedial interference.

With regard to the experience collected at Davos am Platz, accurate records date only from February 1865, when Dr. Unger, himself formerly consumptive, and then not yet quite recovered, came to the village, accompanied by a young gentleman with extensive lung-disease. Between February 1865 and March 1867, 35 patients with consumptive affections had been under the observation and treatment of Drs. Spengler and Unger, who have kindly furnished me with a report; of which, however, I can only give a very short summary. Of these 35 cases, only 1, belonging to a consumptive family, offered no distinct signs to auscultation and percussion, although the spirometer shewed a considerable impairment of the respiratory capacity. Of the other 34 cases, 19 were in the first stage, with distinct deposits; 15 in the second, with cavities. Of the 19 in the first stage, 2 had deposits in both sides, and some had other complications, as pleuritic effusion; 7 of the 19 left cured, 6 improved, 6 remained under treatment.; 18 of the 19 had gained in weight; 8 had previously had attacks of hæmoptysis, which only in one of them returned in a very slight degree during the stay. Attacks of fresh colds were remarkably rare in all of them. Of the 15 in the second stage, only 2 were free from fever; 3 of them had pleuritic exudations; 5 of the 15 died (3 from gradual consumption, 2 from hæmoptysis); 1 left worse than he arrived; 1 improved; 2, who had arrived with advanced pulmonary disease, are steadily improving; and 1 is regarded as perfectly convalescent. It is worthy of remark, that diarrhoea did not occur in any of them, and that the night-perspiration in almost all cases disappeared after a short stay. In

one case only, careless exposure led to a croupous pneumonia of the left lower lobe, with a favourable termination on the fifth day.

The treatment adopted at the Davos consists in the use of much milk, and light nourishing food; a moderate amount of wine, principally the red wine of the Valteline; and graduated exercise, first on level, later up hill. The cold douche is likewise in many cases used with advantage.

Those who consider the facts related will probably not deny that they offer testimony in favour of mountainous climates. The two cases which at a later period ended fatally are particularly instructive, by shewing that a curative process had taken place during the stay in elevated regions. Both cases, and probably also the three others related, belonged to the class described by Addison under the head of pneumonic phthisis. It is probably on these low forms of catarrhal pneumonia, with a tendency to chronic infiltration, cheesy transformation, and formation of cavities, that the Alpine climates have a truly curative and prophylactic influence.

The question, how the mountain climates exercise so favourable an influence, can probably not be answered without entering the field of theories, which I wish to avoid as much as possible. There are, however, some undeniable facts. Thus the air of elevated regions is lighter, more rarefied, and cooler; and it is usually free from the foreign admixtures found in towns, and also free from the various kinds of malaria. The food, the occupation, and the whole manner of living, are generally different from those prevailing in large towns and much inhabited districts. The influence observed by most people on their removal to mountainous climates is an improvement of appetite, digestion, formation of blood, and nutrition in general. Exhilaration and increased inclination to exercise are likewise frequent attendants of the change. All the influences enumerated, to which others might be added, are of importance in the consideration of the question before us. I will only allude to one; viz., the rarefied air. A given volume of air contains absolutely less oxygen and other constituents at an elevation of 5,000 feet, than at the level of the sea. The movements of the thorax must, therefore, be increased, if the same amount of oxygen is to be introduced; or a smaller amount of oxygen will be introduced, if the movements of the thorax remain the same. It has been asserted, but, as far as I know, not yet been proved experimentally, that the inspirations on mountains are deeper. Healthy persons, at all events, usually have an inclination to take deeper inspirations; and the broad chest of mountaineers may be regarded as an effect of increased respiratory movements. If this view were correct, it might be asked, how far this augmented action of the organs of respiration, and, as a necessary consequence, those of circulation, influences the sanguification and all the processes of nutrition—how far, I say, this mere increase of chest-expansion would go to explain the facts before us. All influences, climatic, physical, or mental, by which the breathing is habitually increased, appear to act beneficially in the tendency to consumption; while all those causing diminished breathing seem to favour, in man and animals, the development of scrofulous and catarrhal inflammations, and of consumptive diseases of the lungs in general.

Although I have already occupied too much space, I must still add a word of caution. Not all consumptive constitutions probably are fit for the Alpine climate, and not all the stages of consumptive disease may be benefited. The invalid ought not to be allowed to go to any Alpine climate he likes, and do there as he pleases; but he ought to be directed to a place where he can have the advice of a medical man who will carefully superintend his diet, his exercise, and his whole manner of

living. Many invalids lose the benefit obtained in the commencement by over-exercise and careless exposure; and the very help which these climates have given them may be turned by them to their ruin. It is further necessary that the invalid be sent in an early stage of the disease, and that he remain long enough, if possible, to regain the full capacity of healthy lungs; and that he be not allowed to return too early to his former unhealthy residence and occupation. On all these points, however, I cannot suggest better advice than that embodied in the excellent works of Sir James Clark on the *Sanative Influence of Climate*, and on *Pulmonary Consumption*.