THE CROONIAN LECTURES ON THE HYGIENIC AND CLIMATIC TREAT- MENT OF CHRONIC PULMONARY PHTHISIS.

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By HERMANN WEBER, M.D.,

Physician to the German Hospital.

LECTURE II.

(Concluded from page 576.)

Curative Treatment.—Relation of Doctor and Patient.—I. Diet: Defective Digestion; Raulin's Researches on Mineral Substances; Milk; Times of Meals (Cures of Phthisis); Alcohol.—II. Air and Ventilation: Open-air Treatment; Defective Arrangements for the Treatment of Phthisis in General Hospitals; Brompton and Ventnor Hospitals; Necessity for Numerous Small Hospitals for Phthisis in the Country.—III. Exercise.—IV. Management of Skin; Clothing.

II. *Air and Ventilation.*—Although it is generally acknowledged that impure air is the foremost cause of phthisis, and although Dr. Henry Mac Cormac, Dr. B. W. Richardson, and others, have preached not only this, but also that pure air is the most important means of cure, yet we all must confess that, in practice, the first principles of air-treatment are, with rare exceptions, most imperfectly carried out. Wherever climate permits, an entirely open air and tent-life is the best help in the treatment of phthisis; but this is not easily practicable the whole year round in our climates, although much might be done in this direction. Fear of the inclemency of the weather is far too great amongst the public as well as the profession. Patients affected with chronic consumption, without or with only moderate and partial pyrexia, ought to spend the greater part of most days in the open air, and ought not to be deterred by a little rain, or mud, or low temperature, or by the fact that they begin to cough when they come out of the close house into the open air. Arrangements ought to be made by which invalids are enabled, warmly dressed, to sit in the open air, sheltered from wind and rain. It is here where the degree of intelligence of the patient forms an all important element in the chances of success. It is necessary, as I have already stated, to give the patient and his friends an idea of the nature of the illness and the means of cure, and to obtain their intelligent, courageous, and persevering co-operation. The patient must see that, though it is more difficult to carry out the open air principles in an inclement climate, it is yet infinitely more injurious to him to shut himself up in close rooms than to use every possible moment of even an indifferent day to walk or sit in the open air. The improvement of the appetite, the digestion, and the strength, the diminution of night-sweats, of restlessness, and mental depression, are in most instances so marked that the invalid, after some time, begins to have confidence, and to feel that his life is rendered more bearable, even if no cure can be effected. We must always bear in mind that, even in the midst of large towns, the air in open places, and even in the streets, is very much purer than within the houses. The researches of Angus Smith have shown this with regard to the proportion of oxygen and carbonic acid, and other impurities; and those of Miquel, with regard to the number of microbes in the air at Paris, manifest this in a most striking manner, their proportion within the wards of the Hôtel Dieu and of the Notre Dame de la Pitié being much larger than in the Rue Rivoli.

As, however, the greater part of the twenty-four hours is spent indoors, the arrangements of the house, and of the rooms, are of the greatest importance. The invalid ought to have sunny rooms, sitting as well as bed-room; for, though the sun does not shine at night, the vivifying influence which it exercises on the air of the bedroom during the day, does not disappear at once with the cessation of the sunshine, but lasts through the night and longer. Two thousand cubic feet is not too much space for each inmate, and by good ventilation the air ought to be frequently renewed by day and by night. The temperature ought, if possible, never to exceed 62° Fahr., and the open fire is by far the best producer of artificial warmth; gas ought to be entirely excluded. The bed ought to be open on all sides; and the ordinary consumptive invalid ought not to be longer than eight or nine hours in bed, even if the body-temperature be somewhat raised during some hours of the day. It is a horrible custom to keep such invalids during the greater part of the day in bed, unless the weak-

ness be extreme. In all diseases, it would be an useful subject of discussion when a patient is to be in bed, and when not; when he is to take exercise, and when to sit or lie still. But in phthisis the long stay in bed, and particularly in the bedroom, is certainly injurious; breathing, ventilation, lungs, circulation, appetite, tissue-change, almost everything is unfavourably influenced. In acute forms and stages of phthisis, when there is much fever, I do not advise the patient to take active exercise, or to fatigue himself by sitting up during any length of time; but it is certain that during this time pure and fresh air is as necessary as and even more so than, during the non-febrile stages. The bed of the patient ought, therefore, to be placed so that he receives as much open air as possible, without exposure to actual wind or draught. In summer, and also in winter, weather permitting, a couch or bed ought to be placed on a balcony or terrace, or in an open field or garden; the patient ought to be carried to it, and, properly covered, lie there from morning to night, or as long as possible. Some of my patients have spent, during weeks, or even months, a great part of the day in hammocks slung up between trees, with great advantage. The change from the ordinary bed-treatment in a close room, to this open air couch or hammock treatment, is an infinite gain to the patient, who breathes more, eats better, is more cheerful, sleeps more soundly, and is less troubled with perspiration. The pyrexia, likewise, often rapidly decreases.

I shrink, at present, from touching the open air treatment of the poor at their homes, except so far as they likewise should be taught to be as much as possible in the open air, and to sleep with open windows; and I may add that I have seen many instances where a change to open air occupation in all weathers, from indoor work in close workshops or bakehouses, has led to an arrest of disease, and recovery. I must enter, however, a little more fully into the treatment of poor consumptive patients in our general hospitals situated in large towns. There they have usually only between eight hundred and twelve hundred cubic feet of air per head, with ventilation through open windows, which cannot be efficiently carried out without draught, and is, in winter, often sadly neglected. The majority of these patients, even if there be only moderate and partial pyrexia, spend the whole, or by far the greater part, of every day in bed, which, as I have already said, ought not to be, excepting in acute cases, or stages, or in excessive weakness; but if, after the subsidence of the pyrexia, they be out of bed, standing or sitting, or walking about in the wards, they are exposed to draughts, and frequently contract fresh attacks of bronchitis or pleurisy, or other illnesses due to chill; and thus take further steps in their downward course. Although I have always been fond of hospital work, these considerations have for a long time been a source of worry to me, whenever I stood at the bedside of my consumptive patients; and, in despair, I have more than once said that they were at the worst place in the world; and yet the hospital to which I am attached stands on an open spot at Dalston, and has small plots of ground attached to it, where convalescents can sit and walk; while the hospitals in the interior of London are mostly deprived of this advantage. This is, indeed, a subject, gentlemen, which deserves your serious thought; and I earnestly entreat you, if you agree with me, to enlighten the public, and to use your influence to procure better accommodation for the treatment of consumptive patients of the poorer classes.

I know that many medical men, and, perhaps, some of those whom I have the honour of addressing, are not in favour of special hospitals. If the general hospitals be well arranged for the treatment of phthisis, and situated in good air, some of my objections fall to the ground; but these favourable conditions are rarely met with. Very much better are the arrangements in the Brompton Hospital for Consumption, especially in the new building, which I had the advantage of seeing quite recently with Dr. Theodore Williams. Each of the three floors devoted to in-patients consists of a corridor, 10 feet in width; a large central dining-room; ten wards, 13½ feet high, holding from 1 to 8 beds, 46 in all. The average floor-space per bed is 115 feet, the cubic space being 1,400 feet. The ventilation is maintained independently of the windows and fireplaces, and supplies 4,000 cubic feet per hour to each patient. The air is admitted by numerous openings placed on a level with different floors—on the east and north into the galleries, on the west and south into the wards, the greater portion being heated by passing over coils of hot-water pipe; a part is admitted directly. The quantity of hot and cold air can be modified at will, and the temperature is capable of being evenly maintained. The foul air is drawn off from the corridors, wards, etc., through extracting flues built in the walls, and furnished with openings at floor and ceiling. These flues run into large air-ducts beneath the roof, which communicate with four towers heated by steam coils, forming the exhausting chambers. With these arrangements, it is possible for patients to walk about in the corridors, or to sit in the central hall and converse

with one another, without being exposed to draughts and chills. It was a great pleasure to see almost all the patients out of bed. The drawbacks unavoidable with the situation in London, especially with the east and north-east winds, are the ordinary contamination of the air, and the occasional fogs; and the fair results obtained show how much good can be done by judicious treatment and arrangement in spite of such a grave natural defect.

Infinitely more advantageous is the situation of the National Hospital for Consumption at Ventnor, with which I have been acquainted for many years past, and which I have lately again visited under the guidance of Drs. Coghill and Robertson. The Undercliff is so well known to you, that I need not give a description of the delightful and healthy situation. The peculiarities of the arrangement are, you know, that the whole hospital is built in blocks for twelve patients each; that all the patients' rooms face the south; that each patient has a separate sleeping-room of from 1,500 to 1,750 cubic feet, and, in the newest block, 2,000; that each six patients have a separate sitting-room, 3,000 cubic feet space, and each block (12 patients) has an additional room of 3,000 cubic feet, in which breakfast, tea, and supper are served; that male and female patients dine separately in large rooms at the end of the blocks. There are various arrangements for the renewal of air, which, though they would be regarded as satisfactory in other hospitals, have not appeared so to the authorities of the institution; so that in the new block, on Dr. de Chaumont's recommendation, a supply of 5,000 cubic feet of fresh air per head per hour has been adopted, and the fresh air is to be delivered at a temperature of 62° Fahr.

Between the hospital and the sea, there is a large piece of open ground for exercise and sitting in the open air. The diet of the patients is well arranged; the results of the treatment are satisfactory; and the patients are mostly very happy during their stay. What I should like to add are terraces and balconies, on which light beds or couches could be placed for febrile patients to lie on, and thus to enjoy the open air; and, further, large verandahs, glass covered, and with movable glass doors, to be opened and closed at will, so that patients might sit and walk there during wet and wind.

Further useful additions would be seats with shelter overhead, and on three sides, turnable, so that the shelter might be turned against the wind, and the patients sit there with the whole front open, even in rain and windy weather. I should also be inclined to erect in suitable places walls with reflecting surfaces, to serve as shelter from wind, and as reflectors of the sun's warming rays. Hammocks would be at times likewise a comfort.

There are also small sanatoria for consumptive patients at Bournemouth and Torquay, but the number of beds added together is almost infinitesimal compared with the number of consumptive patients belonging to the poorer classes. If there were a hundred of such hospitals, they would be a fair instalment of what is required to meet the most necessary wants. I should not recommend large hospitals, but small ones for 80 or 100 beds, with from one to three or four patients in each room, with balconies to hold one bed, so that one febrile patient could be moved into the open air; and more than one such ought never to be in the room. There should be large verandahs for exercise, and sitting in wet and windy weather, shady and sunny seats, seats as roughly sketched above, with turnable shelter to be used in windy and wet weather; and in other respects arrangements similar to those at Ventnor and Brompton. Each hospital ought to have a resident medical officer, and there ought to be ample room for exercise on level as well as on rising ground; the neighbourhood of a pine forest would be a further advantage. They ought to be in the country, or at the seaside, on account of the greater purity of the air. Even in the suburbs, the air is already much purer than in the interior of towns; thus Miquel found, in 10 cubic metres of the air of Montsouris (a suburb of Paris), 7,600 microbes; in the Rue Rivoli, in the centre of Paris, 55,000; and a still much larger number, as already stated, in the hospital-wards, especially in the winter. It would not be difficult to find fairly suitable localities: Surrey, Kent, Berkshire, and Hampshire have good sites on the southern slopes of their pine-clad hills; for instance, between Leith Hill and Ewhurst Windmill, between East Grinstead, Frant, Wadhurst, and Ticehurst; between Ripley and Cobham; on the Chobham Ridges; between Farnborough, Minley, Bramshill Park, and Eversley; near Haslemere, on the slopes of Black Down and Hind Head. The southern coast, and also the south-eastern, offer fair localities, if care be taken in the selection of the spot, with regard to shelter, dryness of soil, and exercise-ground. The Undercliff, for instance, and the neighbourhood of Bournemouth, still possess some not yet overcrowded sites; also Torquay, Sidmouth, Lyme Regis, Dawlish, Hastings, and perhaps Sandgate. On the coast

of North Devon and Cornwall, and near Llandudno and in Bute, good spots could be found.

I know, gentlemen, that small hospitals for consumption, such as I have suggested, are expensive, and that it will be difficult to find the money; but, if you are convinced of the advantage to the patients, and will use your influence, donations and legacies will come in, and in the course of time, we shall take a step in the right direction.

III. *Exercise*.—Exercise is one of the most powerful and essential means of cure. It is as necessary as air and food, because it enables the invalid to take both in a sufficient quantity to improve the nutrition, by taking up fresh material and removing the waste, and thus to fight a battle with a fair chance of success. Without exercise, I should not like to treat phthisis. To take exercise properly requires, however, the guiding hand of the physician. There are judicious persons who can be taught to become sufficiently acquainted with their entire condition and their surroundings to enable them to do neither too much, nor too little; but such persons are rare amongst consumptive invalids. In many of them, the nutrition of the brain has suffered as much as that of the stomach and lungs, and other systems, and their judgment with regard to their own state and their wants is impaired. We ought, therefore, to bear in mind that by far the majority of those suffering from phthisis require constantly to be held by "leading reins," and must be told what kind of exercise to take, how much, and at what times—walking on level, climbing gently, and with measured increase as to duration and steepness. Riding on horseback, skating, and tobogganing, are all useful exercises under guidance; but overexertion ought to be carefully avoided, and one mistake often destroys the fruit of months and years of judicious management. Up to a certain point, the sense of fatigue is a guide; but not always, for some persons feel fatigue at the beginning of a walk, and improve while taking it; and others never acknowledge to themselves the sense of fatigue. The physician alone can measure the amount of strength, and how it can be maintained and increased by gradually increasing exercise. Climbing is especially useful, as it brings the whole systems of circulation and respiration into play, and leads to expansion of the lungs and thorax, and strengthening of the respiratory muscles. Regulated climbing for a course of weeks and months, in suitable cases, has a wonderful effect on every organ and function of the body; not only respiration and circulation, but the digestion, the action of the skin, sleep, mental power, resistance to changes of temperature—all show the beneficial effect, and we scarcely doubt that this is due to an improvement of Beale's bioplasm or "living matter" in the cells. Riding on horseback, as already recommended by Sydenham, is likewise excellent exercise, exhilarating and accelerating the circulation, and, through this, the respiration; and it has been the principal means of treatment in several cases of recovery under my observation. Riding on donkeys may, in some localities, be substituted for horse-exercise. Tricycling is likewise useful to some invalids. Pulmonary gymnastics—that is, a methodical deep inspiration, followed, after a pause, by full expiration, practised in pure air, several times a day, are very useful in chronic non-febrile cases. Well arranged exercises of the upper extremities materially assist the expansion of the apices and the subclavicular regions.

Where active exercise is impossible from great weakness, or forbidden from inflammatory complications, the movement in a Bath chair is especially to be recommended; and, by turning the head against the wind, it can be used in almost all weathers. Open carriage exercise is likewise good; but there ought to be only little wind, or some arrangement for sheltering from the wind, by having, for instance, the front hood up, and sitting with the back to the horses, which can be well arranged in landaus. Those who have the chance of being rowed in a boat up and down a river, or on calm days on the sea, often derive great benefit from this mode of motion. In some cases, under my observation, well arranged journeys, in agreeable company, in rowing boats, or small yachts, or steamers up the Thames, the Rhine, the Maine, the Neckar, the Danube, the Isar, the Seine, and Meuse, have had very beneficial effects on body, as well as on mind, and the latter ought never to be forgotten in phthisis. In some very chronic cases of nerve-prostration, with inability to walk and to take food in sufficient quantity, massage can, with advantage, take the place of active exercise, being a powerful accelerator of tissue-change, and leading to increased breathing and improved circulation. I have as yet had only a few cases in which I have recommended a plan somewhat analogous to that of Weir Mitchell and Playfair, though very much less energetic, but with evident advantage on nutrition, and on muscular and mental energy. It appears to me, as far as my experience goes, that there should be no active lung-symptoms. The

open-air treatment has been combined in those cases with massage, the patient having been placed, during a great part of the day, on a couch on the balcony or in the garden; walking exercise was not allowed during the first part of the massage-treatment, but was gradually substituted for it.

iv. *Strengthening of the Skin.*—Weakness of the skin is one of the prominent features, as well in the tendency to phthisis, as in the developed disease, and ought always to be taken into consideration, and remedied, if possible. A slight change of external temperature, or exposure to a slight draught, a change of clothing, is apt to produce chill, which, by reflex action, is thrown on the lungs; it is also a frequent source of bronchitis and catarrh of the lungs, and also of digestive derangements, and a great obstacle to recovery in phthisis. Constant exposure to the open air and exercise are the best tonics for the skin, and often suffice by themselves; but, in many cases, these must be combined or preceded by the judicious use of hydrotherapeutics. The skin has never been altogether neglected in England, either by medical men or by the public; while, on the Continent, the neglect was incredible, and is still so in many localities: hence systematic hydrotherapeutics have had their origin on the Continent; and in the treatment of phthisis, too, Brehmer was the first to introduce them with special modifications—namely, powerful cold douches to the chest, of very short duration. Unger, Spengler, Dettweiler, and others, have continued and modified this system. Jaccoud, Sée, and other French physicians, are powerful advocates for hydrotherapeutics. Much benefit is, no doubt, obtained by well adopted procedures; but they require most careful management by the physician. Even the ordinary treatment of the skin, in itself, ought to be guided by the physician, who will not only examine the state of the skin, but also the condition of the heart and circulation in all its bearings; the degree of reactive power must be cautiously appreciated and gradually raised. In great weakness, dry-rubbing by an attendant, of one part of the body after another, is all that can be done; then rubbing of the chest with a moist towel, and dry rubbing afterwards; later on, a very rapid sponging with tepid, and again later with cold water, followed by a short return into bed, and a light warm breakfast. It requires already a considerable degree of reactive force to bear with advantage, on rising in the morning, the sponging of the whole body by cool or cold water, followed by brisk friction, as daily practised by the majority of us in health, and forcibly recommended by J. Henry Bennet, whose views on the hygiene in phthisis have exercised good influence. A rapid plunge into cold water is, in many cases of fair reaction, the best plan; in others, a very short shower-bath; and, again, in others, a tepid bath for a couple of minutes, followed by a momentary cold shower or plunge into cold water. Many sound hints on bathing, and on the management of the skin, may be gathered from the editor of the *Book of Health*, in his article on the Skin.

Although by this means the skin becomes strengthened, yet the invalid ought never to neglect woollen-clothing, from head to foot. He ought not to overload himself with heavy garments while walking or riding; but he ought to have plenty of warm wraps when he sits down, or takes passive exercise. The influence of dress on health has been well discussed in a paper by Mr. F. Treves, in the *Book of Health*; and Pettenkofer's little book, translated into English by A. Hess, is full of useful information.

THE Duke of Devonshire has been elected President of the Chesterfield and North Derbyshire Hospital for the ensuing year.

BEQUESTS AND DONATIONS.—Miss Mary Clark, of Albert Road, Regent's Park, has bequeathed £400 to the British Home for Incurables, £300 to the Central London Ophthalmic Hospital, £250 to the Royal Free Hospital, £250 to University College Hospital, £250 to the City of London Hospital for Diseases of the Chest, £200 to the Hospital for French Refugees, £200 to King's College Hospital, and £200 to the Royal Westminster Ophthalmic Hospital.—The Birmingham and Midland Counties Sanatorium has received £250 under the will of Mr. Peter Roxburgh.—Mr. Wm. Brander has given £100, being the first instalment of £500, to the building fund of the new Great Northern Central Hospital.—Mr. Wm. Hartridge, of the Stock Exchange, has bequeathed £200 to the Earlswood Asylum for Idiots, and £200 to the Royal Hospital for Incurables.—The Norfolk and Norwich Hospital has received £100 under the will of the Rev. John Shulldham, of Wood Norton.—Mr. William Jones Loyd has given £100 to the building fund of the new Great Northern Central Hospital.—The Trustees of Prison Charities have given £31 10s. to the Seaside Branch of the Metropolitan Convalescent Institution at Bexhill.

ABSTRACT OF LECTURES ON SOME POINTS IN THE ANATOMY AND PHYSIOLOGY OF THE EYE.

Delivered at the Royal College of Surgeons of England.

By W. A. BRAILEY, M.D., M.R.C.S.,

Hunterian Professor at the Royal College of Surgeons; Ophthalmic Surgeon to the Evelina Hospital; Assistant Ophthalmic Surgeon and Joint Lecturer on Comparative Anatomy at Guy's Hospital.

LECTURE II.

THE ciliary body next demands our attention; and, in connection with it, I propose to make some remarks upon the suspensory ligament of the lens. I have at once to admit that every point in the anatomy of this region is by no means clear to me. I shall indicate these weak spots as we encounter them. The total thickness of the ciliary body and folds is 1.6 millimètres, of which 0.7 millimètre is constituted by the folds themselves, the measurement being made where they are highest; its total length is 4.5 millimètres. In the adult, it attains its greatest thickness in front, that is, about the level of the origin of its muscular fibres, and it tapers off gradually backwards to its termination at the ora serrata. The ciliary folds are 1.5 millimètres in length, and their anterior terminations, which are on the base of the iris, project 0.5 millimètre in front of the level of the ciliary body. The longitudinal, radial, and circular fibres of the ciliary muscle shade off gradually into each other. The outermost of the longitudinal fibres are those which I pointed out at my last lecture as arising from those fibres of the ligamentum pectinatum which have traversed the circularly running fibres of the sclerotic of this region. The radial fibres of the ciliary muscle not only converge towards the axis of the eye, but are in reality slightly oblique, passing backwards from their origin, some to the right, and others towards the left, so as to decussate with their neighbours. This obliquity is still more marked in the so-called circular fibres, till at last the innermost of them have, in reality, a nearly circular course.

It follows, therefore, that the apparent relative number and development of these three sets of fibres will depend upon the position of the ciliary muscle, or, rather, of the ciliary body which contains it. If this be placed well forwards, so that a considerable portion of it lies in front of the termination of the ligamentum pectinatum, we have an apparent increase in the circular fibres at the expense of the others. If, on the other hand, the ciliary body and its contained muscle be stretched somewhat backward, the circular fibres appear very few, most of them being now so oblique as to be included among the fibres commonly called radial. Now, in the child, the ciliary body is situated more anteriorly with regard to the ligamentum pectinatum than in the adult. Consequently, very many of the most internal or oblique fibres have now really become circular in their course, and this portion of the muscle seems very large in antero-posterior section (Fig. 3). But as the ciliary body, and with it, o

FIG. 3.

course, the muscle, recedes with advancing years, the longitudinal and radial fibres appear increased at the expense of the rest. This alteration in the position of the ciliary body is associated with the disappearance in adults of the circular ridge which projects internally just behind Schlemm's canal, and which has been described as resulting from a pulling in, as it were, of that part of the sclerotic.

The same result will be produced in infants by glaucomatous dis-