

It is of no use to talk with those who contrive to exist under such circumstances. "Us lives as long as our neighbours, and us pays our way; and I don't see any use in what you talk of," was the reply of one magnate to my remarks, though severe disease was so prevalent in his community. But I submit it to the judgment of the profession, whether there is not a close connexion between the two states? Is there no connexion between such tenures and such a state of things, that whilst much around is flourishing, here is neglect or decay; and that within sight of, and only a few bowshots distant from, one of our towns of luxury and ease, and whose practitioners boast of their ignorance of fever?

I should much like to know the experience of others, as to the state of parishes under such tenure; since, if such are its effects elsewhere, it is high time that its days were numbered. And it is no more political to discuss such questions, than it is polemical to investigate the educational neglect of such and similar localities.

There doubtless is a connexion, since pathology points out that derangement of function always results from some change, either in the structure or composition of the tissue itself, or from some corresponding vitiation in its proper stimuli. Under such conditions, the vital tonicity of all is diminished, and the typhoid ferment soon vitiates the fluids.

The place lies on the lias, consisting of lias proper, blue marl, and clay. Under this lies the saliniferous marl of the new red sandstone formations, and which crop up at not distant places. The saliniferous current seemingly takes a southern direction, passing through Droitwich, Tewkesbury, Cheltenham, Stroud, etc.; at all which places saliniferous springs are to be found, occasionally impregnated with sulphur.

It is a good dark and deep soil of vegetable mould, mingled with the decomposed lias, and capable of high cultivation; but it is evident, from the nature of its underlying formations, that deep and thorough drainage is the only way to render it available for agriculture, or properly habitable for man.

But I fear that, generally, the condition of the rural population will not bear inspection; and that our rank as a nation in the social scale must suffer, if means are not taken for its improvement. Unfortunately, however, enlightenment has only to a very limited extent pervaded the agricultural mind; and its *Epicuri de grege porci* still slumber on.

Tewkesbury, Gloucestershire, August 25th, 1853.

ON THE TREATMENT OF CHRONIC AND OTHER DISEASES BY BATHS OF COMPRESSED AIR.

By THOMAS POYSER, Esq., F.R.C.S.Eng.

As I am not aware that the treatment of diseases by baths of compressed air, now practised so extensively and successfully at Lyons, has been described in this or the other medical journals, a short account of it may not be unacceptable. Under this impression, I subjoin a translation I have made of a small tract, recently published by Dr. Milliet (descriptive of the method of constructing and using these baths), which was placed in my hands a week or two ago, by Dr. Strange, of Naples. This gentleman, who is now in this country, visited Lyons on his way, and made particular inquiries of the medical practitioners there, as to the extent to which this treatment is carried, and the success attending it.

The result of Dr. Strange's investigation led him to form a very high opinion of the great advantages of this practice, in the management of many obstinate and intractable diseases. From his testimony, and from a communication with which I have been favoured by Dr. Petrequin, I am induced to think that it merits the attention of medical men

in this country. Dr. Pétrequin was for many years principal surgeon to the Hôtel Dieu of Lyons, and is now in extensive practice in that city. He is also favourably known by his researches on the salts of manganese in combination with steel; and by his introduction of these valuable remedies into medical practice.

Dr. Pétrequin has no interest whatever in these baths: that is, he is neither the inventor, nor does he derive any emolument from them; but he has frequently witnessed their effects, and the following short statement is chiefly the result of his own experience. He believes that the bath acts on the system in two ways: 1. By its mechanical pressure. 2. Chemically, by infusing into the system, *i. e.* the blood, a larger quantity of oxygen than it would otherwise receive.

1. The effect of pressure on the surface of the body is, to drive the blood into the interior parts, and thereby give the vessels time to recover their tone: in this way inflammatory eruptions of the skin, and ophthalmia, are relieved or removed. Dr. P. has seen patients go into the bath with the conjunctiva quite red, and in a short time come out perfectly pale. He does not state that this effect is always permanent; but, by repeating the process, time is given for the vessels to recover themselves, and the disease is effectually removed. Again, pressure acts on the absorbent system in a remarkable manner, as is frequently witnessed in the absorption of external tumours; but it is only by means of the air-bath that this pressure can be applied to the lungs and air-tubes. Dr. Pétrequin believes that by means of this bath, we can cause absorption of the lymph or mucus which is effused in cases of bronchitis, either on the surface of the mucous membrane, or between this and the lungs; and which thereby prevents the entrance of oxygen into the blood. Dr. Pétrequin goes so far as to assert, that this pressure will cause the absorption of tuberculous deposits in the air-cells; but he does not state that he has witnessed any positive proof of this having been accomplished.

2. Dr. Pétrequin believes that the bath acts favourably in many diseases on chemical principles, by infusing a larger quantity of oxygen into the blood than it would otherwise receive. The fall of the pulse, and the diminution in the number of respirations, soon after entering the bath, are remarkable proofs of the correctness of this theory: for if at each inspiration a third more of atmospheric air can be introduced into the lungs, it is clear that the inspirations may be diminished by one third, and the same quantity of air be still received. As the number of pulsations bears in general a certain proportion to the number of respirations (say about four to one), it is evident that, as these diminish in frequency, the pulsations will do the same.

M. Pétrequin has seen the pulse fall in a short time from 120 to 80, or less. On these two principles of mechanical pressure and increased supply of oxygen, the compressed air-bath has been used with advantage in asthma, humid or spasmodic, but more particularly in the former; in emphysema, and various other chronic affections of the lungs and air-passages; in deafness dependent on thickening of the membrane of the ear: in various affections of the uterine system, amenorrhœa, chlorosis, chronic inflammations, etc., etc.; in enlargement of the liver and spleen, and other visceral diseases; also in dyspepsia, hypochondriasis, and in almost every kind of chronic disease.

Having made this short statement of the high estimation in which these baths are held by eminent and disinterested physicians who have witnessed their effects, I now proceed to give the proprietor's account of the method of constructing and using them.

THE MEDICO-PNEUMATIC ESTABLISHMENT OF AIR-BATHS AT LYONS. BY DR. MILLIET.

This establishment, which I opened at Lyons last year, was erected under the direction and advice of the inventor himself, M. Tabarié. I thought I could not do better than to act up to his principles, his process, and method.

The physical phenomenon which characterises this process is the augmentation of atmospheric pressure, and de-

depends on that property of the air, its *compressibility*; hence it results that in pumping the air in, we can retain in the same space a quantity infinitely greater than in the ordinary state. It is this which happens in the air-bath. To a volume of the confined atmosphere, which cannot vary, we increase successively the quantity of air which it contains; the retained air tries to escape, and then this pressure acts on a double glass tube, in the form of V, half filled with mercury; and influences, from its force, the ascent in the mercury in the opposite branch. This mercurial tube is the guide and test of the pressure, *i. e.*, of the quantity of air contained in a given volume; it is, in fact, the manometer.

The air that is collected in this apparatus is the ordinary atmospheric air; it undergoes no change; its temperature is that of the external air in temperate seasons of the year; but in extreme seasons it is cooled or warmed, in such manner that the patient neither experiences the sensation of heat nor cold.

The apparatuses are hollow spheroids of wrought iron, of various sizes. I have had three constructed of different dimensions. Two are intended to contain one person, or two at the most. They are about five feet in diameter, and ten high. The third is a collective apparatus, which will contain ten or twelve persons at a time. It is about ten feet in diameter, and has a vestibule or porch, by which any one may enter or leave it, without disturbing the progress of the operation. In the small apparatus, light is admitted by an opening about thirty-three inches long and eighteen wide. The collective apparatus is lighted by four windows, of about five feet high and one and a half wide. The doors of the small apparatus are about five feet high and two wide, and are made of wrought iron; and so thick as to resist a pressure two or three times greater than the maximum one. The doors of the large apparatus are of cast iron, about an inch thick. Their dimensions are, in height about six feet, and in width two and a half. The interior of these apparatuses is lined with silk, to prevent the disagreeable contact of the iron. The inferior segment of the spheroid is carpeted, and the whole has the appearance and comfort of a parlour. The air is pumped in through a tube placed under the carpet, and in the centre of the upper dome, is placed a tube for the escape of the excess of air, and of that vitiated by respiration. The pumps have a diameter sufficient to furnish hourly in the small apparatus 45,000 litres (upwards of 10,000 gallons) of air. In the large apparatus there is the same disposal of the conduits; but the pump which supplies it furnishes a greatly increased quantity of air, and consequently gives an enormous renewal of it. The pumps are worked by steam engines, one of three horse power, the other of ten. The mercurial manometer regulates and directs the pressure. The least pressure that I employ is about fourteen inches of a column of mercury, or nearly half an atmosphere. The greatest pressure is about twenty inches, or two-thirds of an atmosphere. The duration of each sitting or bath is two hours.

The first half hour is occupied in raising the pressure to the desired height; the next hour, the pressure is continued the same; and the last half hour is employed in reducing it to its ordinary state. This slowness in the transitions is the fundamental law in the air-bath: unless the change or transition be well regulated, the air-bath will do harm instead of good. It is certain that, if this law had been known in the submarine excursions with the diving-bell, many of the injuries from it would have been avoided.

During the whole sitting, an assistant directs the elevation, duration, and decline of the pressure. He does not quit his post for an instant; so that the patient may obtain from him, at any moment, any assistance or change he may require.

The air-pumps and engines are superintended and directed by any engineer during the whole time they are employed. The patient, while in the bath, can read or talk at his ease; and, with the exception of a slight pressure on the ears (a sensation which usually goes off on swallowing a little of the saliva), experiences no feeling which can

make him think he is not in, and breathing the ordinary atmospheric air.

These structures or baths, to which we have given the name of "bells", from their resemblance to the diving-bell, are placed in two elegant cases, separated from each other by a small entrance hall. From the interior of the apparatus, the view extends over the plains of Dauphiny, between the Rhone and the Alps. A library and the journals are at the disposal of patients who use these baths.

It is in affections of the organs of respiration, and of the circulation, that the compressed air-baths exert their special influence, and effect a new and peculiar mode of treatment. I do not intend here to show or trace the extent of their influence, leaving that to experience, which can alone settle it. I can, however, say with truth, that, in all the chronic diseases of respiration which I have treated, my success has exceeded my expectation. In fact, we may conceive that, in diseases of the lungs, its action is direct, whether the compressed air act by assisting sanguification, or by regulating and harmonizing the circulation. One of the most remarkable phenomena occasioned by the increase of atmospheric pressure, is the retardation of the circulation; in the majority of cases, the pulse is reduced from 100 to 45, or even less, in the minute. In four or five cases of inflammatory fever which I have treated in this way, the fever ceased after the first sitting; and in the case of my aunt, aged 74, the pulse, which was 120, fell to 60, and so continued. The explanation of this reduction of the circulation appears to me very simple. Submitted to a pressure greater than that of the atmosphere, the lungs find in an equal volume a much increased quantity of air. Respiration is rendered easy; the movements of expiration and inspiration less frequent to obtain the same result—the alimentation of the lungs. On the other hand, we know that, if we voluntarily quicken the breathing, the frequency of the pulse is increased: hence, if we place ourselves in such a situation that the number of inspirations be less, the frequency of the circulation will in the same proportion be diminished. This is precisely the physiological effect on the lungs, under the influence of the compressed air-bath.

The slowness of the circulation is not constant. It sometimes happens that it is increased. This effect is produced when the respiration is straightened or impeded; the compressed air restores it to its healthy state; and the acceleration of the circulation is the result of this return to the normal condition. It continues, when it is produced, only during the time of the sitting.

One of the effects of the employment of compressed air is the increase of secretion and of absorption. These two functions appear to depend on the increased activity of the venous circulation, which is always more active and complete while our organisation is submitted to a more elevated pressure.

In the majority of chronic affections of the respiration, the compressed air acts at first as a sedative; it relieves the symptoms, and the patient feels better; but generally, towards the twelfth or fifteenth bath, he is not so well, and experiences some return of the symptoms. This irritation may continue two or three days, but gives way to the employment of the same means. It is difficult to assign a limit to the duration of this mode of treatment; the mean time is about thirty or forty baths.

To give an account of the phenomena which present themselves in the treatment of chronic affections of the air passages, it would be necessary to enumerate them all successively; and they vary with the different cases. I have in no instance seen the employment of this therapeutic measure occasion any ill effect, or induce the patient to renounce it. All that I have treated have borne it without the least inconvenience. With regard to the principle of this healing influence, exercised in conditions so varied and so extensive, it connects itself with the powerful modification which the system of air-baths may introduce into the atmospheric fluid, in its various physical, dynamical, and chemical relations. The air-baths may also generally be united with any other medical or hygienic treatment.

They assist in the most remarkable manner the development of the constitution in infancy and youth, and render more firm the general health.

It is not our object to describe the various maladies which may be treated by the air-bath. We can, however, affirm that it may be used with success in all the chronic diseases of the air-passages, from the most simple catarrh to the most complicated pulmonary emphysema; and its curative influence is well marked. In the early stages even of pulmonary consumption, it may be advantageously employed. In some cases of this disease which I have treated, and which have been witnessed by Professor Bouisson of Montpellier, and by Dr. Devay, the success has fully justified our expectations.

Considered in a philosophical point of view, the compressed air-bath may be regarded as the subjugation of our atmosphere, by which we can increase or diminish the pressure which establishes the equilibrium of our organisation. In fact, we know that, in decreasing the surrounding atmospheric pressure, this equilibrium is broken, and sanguineous extravasations take place. The phenomena which present themselves in aërostatic ascensions are opposed to those which take place under the influence of compressed air, by which equilibration is kept up in all the functions.

Besides the physical condition of pressure, we can, through the aid of the same apparatus, convey chemical modifications to the atmosphere, and diminish or augment the proportion of its different gases. In one word, we can so far modify the atmosphere with which the Creator has surrounded us, as to render it more amenable to our wants and necessities. Regarded in this double point of view, this discovery marks a new era, and is a blessing to mankind. I feel myself honoured in devoting my efforts wholly to this undertaking—so full of hopes and promises for the future. To develop the beneficial effects of the air-baths, and to render the employment of them more general, and thus to multiply their advantages, will be my hope, and the end and ambition of my whole medical career.

Wirksworth, August 26th, 1853.

ON THE PATHOLOGY OF PHTHISIS.

By CORNELIUS BLACK, M.D.

As many members of the medical profession have requested from me an abstract of my researches into the pathology of pulmonary consumption—as several of my reviewers have expressed a desire for an early completion of my work "On the Pathology of the Bronchio-Pulmonary Mucous Membrane"—and as the immense chemical and microscopical labour necessary for the full and perfect investigation of the numerous data on which I proceed preclude the possibility of an immediate publication of part II, I may be permitted, in the meantime, to indicate some of the results at which I have arrived.

Assuming that the first substantive deflection from the standard of perfect health is in a deficient vitality of the formative elements of the blood, the origin, manifestation, and progress of pulmonary consumption are briefly enunciated in the following propositions:—

- I. That pulmonary consumption observes three stages.
 - a. The stage of Local Predisposition.
 - b. The stage of Deposition.
 - c. The stage of Germination.

II. That the stage of local predisposition is characterised by more or less excess of blood in the pulmonary capillaries of the affected part; that it corresponds to the first pathological condition of bronchitis and of pulmonary cellulitis; that the degree and extent of this local predisposition vary considerably; and that the resulting phenomena bear a proportionate ratio in point of severity and appreciability.

III. That the stage of deposition is attended by increased exudation from the pulmonary capillaries; that this exudation is incapable of entering into structural relation with the pulmonary tissues; that it leads to a more or less rapid thickening of the basement structure of the bronchio-pul-

monary membrane; that it likewise accumulates in the intervascular and intercellular spaces; and that the pulmonary tissue is thereby more or less consolidated.

IV. That the first appreciable sign of the stage of germination is a shedding of the epithelium of the affected portion of lung; that this epithelium does not attain perfect mucus-cell development; that in cases in which the deposition has been slow, it (the epithelium) is more granular than are properly developed mucus-cells; but that the epithelium is still more granular in cases of rapid tubercular deposition.

V. That the epithelium thus shed is not, in progressive tubercular disease, replaced; that, so long as a particle of healthy basement structure exists, the nuclear points of that structure attempt to replace such lost epithelium; but that this properly vitalised basement structure failing before such attempt at the restoration of the epithelium has succeeded, the latter is now cast off in the form of basement patches, which show, here and there, a germinating point.

VI. That the tubercular deposit undergoes, during germination, more or less development into cells; that this growth constitutes the "softening" of authors; that it takes place contemporaneously throughout each isolated and individual mass of tubercle; that it, therefore, does not first commence at either the centre or circumference of the exudation; but that it proceeds more rapidly at the circumference, because at this point the conditions of cell growth are more abundant than at the centre. At the circumference, therefore, plastic and pus-cells abound; at the centre, exudation-cells.

VII. That in the cheesy looking portions of tuberculous sputum there are very frequently, indeed, portions of nerve tubes, and occasionally of lymphatic vessels and of the minute bronchi; that, in other portions of such sputum, plates of cholesterine, the colouring matter of the bile, cystine, and urate of ammonia are occasionally seen by the microscope.

VIII. That the microscopic appearance of the nerve-tubes thus expelled shows that the nerves do not terminate in loops upon the pulmonary mucous membrane, but in bulbous expansions, to be hereafter depicted.

IX. That the foregoing observations show pulmonary consumption to consist in anormal nutrition, and to be essentially analogous, in its steps, to inflammation; but that the term "inflammation" would be inapplicable to it, inasmuch as it fails to explain the cause of the deficient vitality of the blood-plasma, which constitutes the essential nature of tubercle.

Chesterfield, August 29th, 1853.

CASE OF DOUBTFUL SEX.

By JAMES M. CHURCHILL, Esq.

MR. MANN'S case of doubtful sex, published at p. 720 of the ASSOCIATION JOURNAL for August 19th, induces me to give another.

I was requested to see a young person, aged twelve years, who had been brought up as a female. From the outward appearance, I should not have known that the individual was not a female. I found a penis in miniature, with distinct glans, corona glandis, and præputium, as in Mr. Mann's case; but the urethra was situated just as it commonly is in the female, and the vulva was also exactly in appearance that of a female of similar age. I delayed further investigation for a year, at the expiration of which period I found a scrotum on the right side, containing a testicle; and, six months afterwards, another testicle descended on the opposite side. Soon after this, he lost his parents, and went to London, where the male dress was adopted. He had been sorely perplexed to determine which trade would be the least likely to expose his infirmity; but at last he adopted that of a confectioner. This may be a useful hint to others of doubtful sex.

Colchester, Sep. 2nd, 1853.