down a long flight of stone-stairs, but had determined not to say anything about it to any one.

In acute cases such as this, then, I think the course of the surgeon is quite clear. He may find a band, or some temporary obstruction, which he may be able to relieve; he may find an intussusception, which he may be able to unfold; or an internal hernia, of some kind such as I have described.

Much more difficult cases to deal with are those of slower development, and less urgency of distress; such as may arise from occlusion by faecal accumulation, by some localised inflammation, by chronic invagination, or by implication in some diseased process, not inherent in the intestine itself, but in surrounding parts, and involving it. In such, we have more time for deliberation; and by careful observation, we may generally, I think, come to a safe conclusion as to whether nature may be trusted with the case, or whether an exploration has become necessary. But we are more liable to be misled in these than in the former cases. Let me relate a case in point.

I was once summoned to such a case at a distance, and was urged by the practitioner in attendance to explore. I at once declined, on the ground that the symptoms were neither sufficiently urgent to demand so serious a proceeding, nor was the time during which they had existed sufficiently long.

Moreover, I received from the patient, in justification of delay, the assurance that, on three previous occasions, she had passed through similar and worse symptoms and recovered, and felt quite sure she should do so again. I left her, and, I must say, felt no very great anxiety about her; but, on the fifth day afterwards, I was hastily summoned to her again, and found her in a condition of collapse, from which I saw in a moment that she could not recover unless something could be done by operation, and I proceeded to operate at once. I shall not readily forget the distress I experienced when I saw the solution of the difficulty, for I had lost an opportunity to save a life that might, perhaps, have been saved. Stretching from the left ilium to the front of the sacrum was an old inflammatory band, which formed a bridle across the rectum, and lightly obstructed it. Faeces passing from the sigmoid flexure into the rectum were, to some extent, obstructed by it in their course, and such obstruction had, no doubt, been the cause of the previous illnesses of which I had heard. But this time there was this much more: a large intestinal concretion, probably of biliary origin, had got so far on its way as the obstructing band; that it could not pass, and the band was too strong to yield; so in the struggle between them the intestine had become gangrenous around the obstruction, and had given way.

Of course, the patient died, and, though I could not charge myself with the blame of her death, I have never ceased to feel that, had I operated when I was first urged to do so, she might have been saved.

Then, finally, there are those long continued cases, manifestly chronic, commencing originally with almost unnoticeable symptoms, which go on growing worse and worse from week to week, and from month to month, until at last it becomes a case of either death or operation, and probably of death any way. These are the cases which generally depend upon abnormal growths of some kind or other, either in the intestine itself, or in neighbouring structures, in which, as I have said, I should feel inclined to explore as a *dernier ressort* and be guided by what I found as to what I did.

Into one or other of these three classes most cases of intestinal obstruction will fall; and just as the bent of your judgment is of the very active surgical order or the reverse, so, probably, will your practice be; and if you live to enjoy length of days, and much surgical experience, I feel pretty sure that, in the end, you will come to very much the same conclusion as I have done.

DISTRICT NURSING.—A very good work is being done by the various organisations for providing skilled nursing to the sick poor in their own homes. When this can be combined with a system of supplying the needs of small tradespeople, skilled artisans, and others able to pay a moderate fee, the work is not only more useful, but rests on a sounder basis. The East London Nursing Society recently held its annual meeting at the Mansion House, and the report gives a good idea of the magnitude of the work which may be done for a comparatively small expenditure. The number of serious cases attended was 1,577; of slight cases, 2,189; the total number of visits, 58,610; cases of night-nursing, 142; 1,426 of those nursed were women, many of them mothers of families; 621 were men, in almost all cases bread-winners; 492 were children under 14. This is one way, and a very good way, of relieving the congestion of which the hospitals complain.

LECTURES

ON

THE COMPRESSED AIR BATH AND ITS USES IN THE TREATMENT OF DISEASE.

By C. THEODORE WILLIAMS, M.A., M.D., F.R.C.P.,
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LECTURE I.

THE use of atmospheric air, under different degrees of barometric pressure, in the treatment of disease, is one of the most important advances of modern medicine; and when we consider the simplicity of the agent, the exact methods by which it may be applied, and the precision with which it can be regulated to the requirements of each individual, we are astonished that, in England, this method of treatment has been so little used.

In therapeutics, air is employed in three ways.

1. At diminished barometric pressure, or rarefied. 2. Air at increased pressure, or compressed air. 3. Air mixed with other gases and compressed.

Rarefied air was first applied to the human body by Junod, who, in 1835, contrived a hollow copper ball, $1\frac{1}{2}$ metres in diameter, to hold a man, and, by an exhausting apparatus, reduced the barometric pressure one-third, producing distension of the *membrana tympani*, dyspnoea, chiefly in the form of quick short respirations, turgescence of the superficial vessels of the body, as seen in the eyelids and lips, and diminution of the salivary, renal, and other glandular secretions. Junod, not being favourably impressed by these experiments, betook himself to the localised application of rarefied air to various parts of the body, in which he had more success, for his inventions of cupping-glasses, and of Junod's boot, by which atmospheric pressure can be reduced over large surfaces of skin, have been, and are still, largely used with great benefit.

Another method of reducing atmospheric pressure locally, is Waldenburg's apparatus, in which a mask closely fitting the mouth and nose is connected with an exhausting aspirator, and air is thus drawn from the lungs, giving rise to the respiration of an attenuated atmosphere.

Another way of using air at reduced pressure is by balloon-ascents, in which any and every degree of diminution can be attained, from the slight reduction experienced in captive balloons, often sent up at fairs and places of public amusement, to the extraordinary results of Glaisher's and Coxwell's adventurous voyages, where the reduction of the barometric pressure to $9\frac{3}{4}$ inches showed an elevation of 29,000 feet; and it is possible that even a greater altitude, and corresponding diminution of pressure, was reached by these aeronauts, after Mr. Glaisher had lost consciousness, and could no longer register observations.

The rapid ascent of balloons, the difficulties of steering, and the impossibility of remaining long in them, render this form of reducing pressure of little use for therapeutics. The most usual method, and the one best adapted for our purposes, is residence at high altitudes; and fortunately, among the various mountain-ranges, we have, in all latitudes, an abundant choice of sites at various elevations and exposures, where we can try the influence of rarefied atmospheres on invalids. While at Davos (5,200 feet) we get a diminution of 5 inches in the barometric pressure, at La Paz, the capital of Bolivia (13,500 feet), it amounts to 12 inches, and we have examples of every intervening grade of elevation. The heights principally used for treatment range from 5,000 to 10,000 feet, giving barometric pressure of from 25 inches to 20.5 inches, and a diminution of from 5 inches to 9.5 inches. It is not the object of these lectures to consider the effects of rarefied air in the human organism, which has been dealt with elsewhere (Treatment of Phthisis by Residence at High Altitudes, *Transactions of the International Congress*, 1881), but rather to treat of the second subject, namely, air at increased pressures, such as is to be obtained in compressed air baths. We know that the air of mines is considerably condensed, and that, if a shaft could be sunk 45 miles deep into the earth, the air at the bottom of it would be as dense as quicksilver; but no mines have been made deep enough to modify

barometric pressure to the inverse extent of that observed on mountains, and our principal results from compressed air come from the employment of diving bells and diving apparatus and pneumatic tubes, used in the construction of piers and bridges, of arches, and the like. In many of these enterprises men have worked, for hours at a time, at a pressure of from $2\frac{1}{2}$ to $4\frac{1}{2}$ atmospheres, and, when proper precautions were observed, apparently without harm. I am largely indebted to the great and masterly work of *Pression Barométrique*, by Paul Bert, for many of the facts cited in this lecture. The amount of evidence which these experiments afford as to the influence of compressed air on the human body is so extensive, and bears so directly on our present subject, that I make no apology for citing some of the leading facts, which we shall find useful in three ways; first, showing the limits of endurance of the human body; second, in demonstrating what steps of the process are dangerous, and what are not so; third, as indicating the means by which peril can be averted.

The pressure of air in diving bells depends entirely on the depth of water reached, which is sometimes considerable; but as the difficulty of renewing the supply of air was great, these instruments were soon replaced by diving dresses and pneumatic tubes.

The symptoms noticed on descending in bells to a depth of about 30 feet, were pains in the ears, noises and even deafness, a sensation of tightness, as if the head were bound with a band of iron. These phenomena only accompanied rapid descent, and ceased entirely when the bottom was reached. The ascent was generally described as more agreeable, but according to Colladon there was a feeling, as if the bones of the skull were separating; no changes in the pulse or respiration were noticed.

Trigot's invention of the pneumatic tube was soon applied largely for the construction of bridges, piers, etc.; and inasmuch as by this means air could be pumped in to the extent of three or four atmospheres, a large number of workers were enabled to remain at their labours below the level of the water for several consecutive hours.

It appears that, in many instances, no special symptoms were experienced, but, in some works at Douchy, out of 64 workmen, 32 suffered more or less, of whom two died. On the other hand one, an asthmatic, improved in breathing, and another, a chloro-anæmic individual, gained colour. Of 22 workmen who commenced labour at 4.15 atmospheres, one had slight hemoptysis, eight experienced muscular pains in different parts of the body, some lasting for several days; and one, a man aged 40, of very robust appearance, who descended the tube only once, died immediately after leaving the tube, the pressure having been reduced in 20 minutes. *Post mortem* examination showed general cutaneous emphysema (not of decomposition), congestion of the lungs of a specially dark tint, the liver, spleen, and kidneys engorged, the blood fluid, and quite black in the heart. Nothing abnormal was observed in the brain, cerebellum, and meninges.

In another case, where reduction of pressure was too rapid, the workman, after exit from the tube, had a corpse-like aspect, with livid face and pupils enormously dilated. The pulse was not perceptible, and the heart-sounds could barely be heard. He became unconscious. Complete muscular paralysis followed unconsciousness, and urine was voided involuntarily. Under warm baths and friction he gradually recovered, but the sight remained affected.

In another case, these symptoms were still more marked, and the patient recovered with weak vision, and was stone deaf.

During the laying of the foundations of a bridge at Londonderry, in 1861, Messrs. Babington and Cuthbert reported accidents among the workmen; one where a man, aged 18, during the reduction of atmospheric pressure, fell down unconscious. He remained in a half comatose condition for eighteen hours, and then, recovering consciousness, found himself totally paralysed below the level of the fourth rib. He lived for over five months, but never recovered sensation or motion.

Another had the same symptoms as the last, except that his paralysis commenced below the eighth dorsal vertebra, and he only survived eight days.

In another case, again, the paralysis was less extensive, being chiefly limited to the right side of the face, the patient was bled, and the blood found to be black and pitchy. The man died after twenty-four hours.

A great bridge was made at St. Louis, United States, the workings being at the depth of 33.70 mètres, at low tide, under a pressure of 4.45 atmospheres. Of 333 workmen, only 30 were seriously affected, of whom 12 died. The doctor of the works remained 2½ hours at a depth of 90 feet. The reduction of pressure was performed in from 3 to 4 minutes. Dr. Bauer noted in the slighter cases muscular pains with choreiform contractions, and hemorrhage from the nose

and lungs. In the grave cases, there was paralysis of different degrees, varying from slight paresis to complete loss of movement and sensation, paralysis of bladder, and urine sanguinolent. Death occurred by coma. The *post mortem* appearances showed hyperæmia of the cerebral and spinal meninges, some cedema of the arachnoid, with softening of the brain and spinal cord.

In one case, the softening occupied the anterior cornea and the lateral striæ throughout the whole cord.

Compressed air is employed also in the apparatus by which divers carry on operations at depths of 54 mètres and less, but it must be remembered that the conditions are not quite the same, owing to the additional pressure of the water on the bodies of these men, which, at that depth, equals 6.4 atmospheres. Accidents seem more common, and deaths are far from rare. It was calculated that, among the sponge-divers of the Greek Archipelago, the mortality was ten per cent., and this does not include the minor accidents. They appear to suffer in much the same way as those working in pneumatic tubes, only more severely; prickings, muscular pains, and pains in the joints are complained of, the prickings (*les puges*) never taking place where there is perspiration, and the muscular pains being most marked in the muscles principally used by divers. One diver had epistaxis at the bottom of the sea, which was repeated in a second descent, and accompanied by severe pain in the head. The serious accidents consist of paralysis of different kinds, and invariably occur after the diver has left the water. The general form is paraplegia, including paralysis of the bladder and of the sphincter ani. In some cases, the loss of power extends to the upper extremities, and is accompanied by loss of sensation over the whole body. Some of the deaths occur immediately after leaving the water, and appear to resemble those which took place at the works at Douchy. A *post mortem* examination after one of the deaths from paralysis showed extravasation of blood between the spinal dura mater and the arachnoid, and the greater part of the spinal cord itself in a condition of softening.

M. Buquoy made observations on the circulation in compressed air-tubes, and, from a large number of instances, concluded that, in the first increase of pressure in the tube, the pulse rises about twenty beats; and that some increase is maintained during the whole stay, falling, at the end of an hour, to seven above the normal; and M. Gal's observations on the pulse of the Greek divers exactly corresponds, for he found, as a rule, an increase of from seventy to ninety beats. M. Buquoy also found that the respiratory rate increased temporarily, but that such increase lasted only about fifteen hours after returning to ordinary conditions. We must bear in mind that, in both pneumatic tubes and in diving, the workmen are engaged in arduous labour, naturally involving an increase in the pulse and respiration rate.

On reviewing the accidents narrated, it would appear that they were much more due to the reduction of the high pressures than to the high pressures themselves. Very few symptoms appear to have been noted during high pressure in the tubes; and it is marvellous how well high pressures were borne; but most of the accidents occurred either during rapid reduction of pressure or subsequent to quitting the tubes after this. In many instances, pressure of 4.45 atmospheres was reduced in three to four minutes—a proceeding which has been proved by experience to be fraught with danger. The symptoms seem principally to be due to lesions of the nervous system, commencing with dyspnoea, quickening of the pulse, muscular pains of more or less intensity, and gradually increasing in severity; then come the different forms of paralysis, including loss of sight and hearing, paraplegia, stupor, loss of consciousness, coma, and death. The divers appear to suffer more intensely than the workmen in compressed air-tubes; but among them, also, the accidents were almost invariably due to rapid diminution of pressure.

It was found that young men bear compressed atmospheres better than the middle-aged.

The accidents appear to have been more common after long exposures to high pressures than after short ones, even when the rate of reduction of pressure was the same in both cases. There is another element of danger which we must not underrate; that is, the diminution of temperature which the rapid reduction of high pressure necessitates, and which must, by cooling the extremities, drive more blood up to the central organs, and specially into those well protected from variations of atmospheric pressure, such as the brain and spinal cord. The experience of all authorities points to rapid increase of pressure as the best method of correcting any bad symptoms shown during the period of reduction.

The number of apparatus devised for condensing and rarefying the air is very large; for, in addition to air-baths, to be described pre-

sently, there are many methods in which the air is inspired through a mask closely fitting to the nose and mouth.¹ Of these, Hauke's was, perhaps, the earliest, of which Waldenburg's, alluded to before, is a modification. This consists of a hollow metal cylinder or bell, containing a certain volume of air, which is plunged into a second and reversed cylinder, containing water. By means of pulleys and weights, an equilibrium is established, and a pipe is passed from the air-cylinder, through a drying box, to a mask fitting the patient's mouth, enabling him to respire the air, which can be either rarefied or condensed by raising or lowering the cylinder in the water. This is done in the first instance, by drawing off water, in the second, by placing weights on the cylinder. Schnitzler's is a further and simpler modification of the same system. Some, as Cube's, and Schnitzler's second form, are double apparatus, and consist of two cylinders, one for condensing and the other for rarefying the air; both are connected by pipes with the inhaling mask, and taps regulate the supply of one or the other to the patient's lungs. A third form is Biedert's, who arranged a species of leather bellows to compress or rarefy the air as required; but the most ingenious example of this form is Fränkel's, which consists of a kind of portable concertina, simple and cheap, and capable of being worked by the patient himself, the objections being the contracted attitude necessary for this purpose, and the impossibility of regulating the pressure. This little instrument is recommended by Oertel for the treatment of asphyxia by artificial respiration.

A fourth form is the apparatus of Geigel and Maydr, constructed on the principle of the centrifugal pump, by which air is stored up in a central reservoir, being compressed by the action of water.

Ingenuous as the above methods are, all have this objection, that their efficacy depends on the completeness with which the patient applies the breathing mask, and also on the amount of pure air available. As a rule, the use of the mask is exceedingly irksome, and many complain of its inducing faintness and headache. It is also impossible to keep up a proper supply of fresh air at the requisite pressure, and consequently there is the danger of rebreathed air. For these reasons, the surrounding a patient with an atmosphere of condensed or rarefied air, which he can respire without let or hindrance from artificial mouth-pieces, is preferable, and air-baths are consequently more easy of application. Nevertheless, the above forms are of great use when compressed air-baths are not available, and when it is advisable, after a course of such baths, to carry on the treatment by condensed air for long periods in the patient's home.

The use of compressed air-baths in the treatment of disease is greatly in vogue on the Continent, where no fewer than fifty establishments exist. For France, there are two excellent ones in Paris, and others at Montpellier, Lyons, and Nice. For Germany, they are to be found at Berlin, Hanover, Stuttgart, Johannisberg, Ems, Wiesbaden, Reichenhall, and Altona; for Switzerland, at Zurich; for Belgium, at Brussels; for Sweden, at Stockholm; for Russia, at St. Petersburg; and for Italy, at Milan. Besides these, others exist scattered throughout Europe.

In England, there are establishments at Ben Rhydding and Ilkley and, till recently, one at Malvern; but there were no others, so far as I know, in England—not even in this great city, which ought to be ever in the van of progress—until the Committee of this hospital constructed one, at great expense, in the new building; an example which, we trust, will be soon followed elsewhere.

The construction of these air-baths varies considerably; the size depending on the number of patients to be accommodated, but the following are the necessary elements.

1. *A circular or ovoid iron chamber*, much resembling an engine-boiler in appearance, constructed in wrought-iron, at least $\frac{3}{4}$ ths of an inch thick, strengthened by girders and ribs of iron, provided with windows of thick plate-glass, and a stout door not larger than sufficient to admit one person at a time. Both windows and doors must fit closely enough to be air-tight, though, as a rule, the centrifugal pressure of the air contained in the chamber renders this easy. The chamber is furnished with the following: (1) an inlet pipe for the supply of fresh air; (2) an outlet pipe for the escape of vitiated air, and for the reduction of pressure; (3) an air-tight cupboard, through which food and drink can be passed to the inmates; (4) other outlets, one in the form of a whistle as an alarm signal in case of bad symptoms, and another with a safety-valve attached to prevent the pressure being excessive. The thickness of the wall depends on the amount of pressure to be used. A thickness of $\frac{3}{4}$ ths of an inch sheet-iron easily sustains a pressure of 10 lbs. on the square inch, the amount most generally employed. The circular form of chamber, with an arched roof, is the one best calculated to resist pressure from within, and has, therefore, been adopted in this hospital. At St. Petersburg, one bath, consisting of two chambers, is constructed of stone, and fitted with double doors, after the fashion of the previously mentioned air-tight cupboard, allowing entrance and exit without alteration of the air-pressure within. There is also a water closet, and patients may, if required, spend several days in these two chambers. At Reichenhall, there is a large iron chamber holding nine persons; and in one of the Paris chambers six or seven may be treated at once; while at Dr. Fontaine's establishment each chamber or *cloche* can only hold two patients. Our bath measures 10 feet in diameter and 8 feet in height, and is constructed to accommodate four persons.

2. *Apparatus for compressing the air.* This is generally done by a steam-engine; the one used at this hospital being of 8 horse-power. At M. Fontaine's bath, hydraulic power is used, the ordinary water-supply pressure of the City of Paris being turned to account to work a very ingenious hydraulic pump, which compresses the air without materially raising its temperature. This method has some advantages, for the air escapes the chance of being heated and rendered unpleasant by contact with the boilers; but by using steam, the pressure can be more quickly increased and steadily maintained.

3. *A central reservoir*, to receive the compressed air, from which it can be drawn off, at will, into the separate chambers. This is the case, at Reichenhall, where three baths are connected with a large anti-chamber, into which the air is pumped; and certainly the supply is likely to be more steady and the current more even, the puffs arising

¹ For a full list, see Oertel, *Respiratorische Therapie*.

from each descent of the piston not being felt in the chamber itself. In most establishments the air is pumped directly into the bath, the supply pipe entering near the floor. In many, as at Johannesburg, Zurich, and Berlin, the pump is arranged to rarely, as well as to condense the air, and this is done by a modification of the valves, or rather by reversing their positions. It is much to be regretted that some arrangement of this sort was not made here, but the initial cost, already very great, was an obstacle.

A receiver for filtering the air from the dust and mechanical impurity is often inserted between the compressor and the air-chamber. It generally consists of a small cylinder or box containing layers of cotton-wool, through which the inlet-pipe passes immediately before its entrance into the bath. In hot weather this cylinder may be partially filled with ice, to reduce the temperature of the air. If this receiver be large enough, it also answers the purpose of a reservoir, and converts the puffs of air into an even current.

On page 771 is a drawing of the Brompton Hospital compressed air-bath, kindly made for me by Mr. Blake, the manager of Messrs. Haden and Sons' works, who were the contractors. It consists of three parts; the engine (A), the receiver (B), and the air-chamber (C). A includes a steam-engine D, which, by means of a fly-wheel and crank, works a second engine, E, in another and separate compartment, F. E is the air-compressing engine, with a cylinder containing an inlet-hole and an outlet-hole, and in this cylinder works the piston H, the plate of which is perforated by diaphragm-valves, which are not here shown, and which close during the descent of the piston and open during its ascent. The air from outside enters the compartment F through the inlet G, and follows the course indicated by the arrows. Entering the air-cylinder, it is driven forward by the piston, through the pipe, I, into the receiver B, containing layers of cotton-wool, W, into the air-chamber. Both I and J contain valves to prevent a return current. The air leaves the bath by an outlet-pipe in the roof, which is always open, the strength of the current through it depending on the rate at which the engine works. M is a safety-valve which opens wide and blows a whistle, when the full pressure of 10 lbs. is reached. L is a glass spyhole, through which the inmates can be watched. N is an airtight cupboard, fitted with double bolts to adjust the pressure, and to enable food and messages, and, if necessary, medicines, to be passed in. Apparatus to regulate the escape of air, which can be worked both from within or outside the bath, complete the chamber, which is lit from without by stout plate-glass windows, and fitted with a strong iron door. The air can be changed about five times in the two hours.

The chamber itself in all cases is furnished with chairs and tables, a water-bottle and glasses to meet the thirst and uncomfortable throat-symptoms, which often accompany increase of pressure; also with a pressure-gauge to record the variations, and a thermometer and a wet and dry bulb apparatus.

Care should be taken that the air be supplied from a pure source, like an open space, as a garden or court-yard, away from all machinery or drainage. It should be filtered through cotton-wool, and the temperature regulated as far as is possible. In some baths there is an apparatus for heating the air, but in our own the temperature has generally been too high rather than too low, and in the hot weather it was found necessary to pass the air through an ice-box, to reduce it sufficiently for the bath purposes. The dryness is seldom a trouble, and a saucer of water on the table will correct it by evaporation.

In some of the German baths, in winter, the temperature falls so low that it has been found necessary to pump in air specially heated. The amount of compression used for medical purposes is small, and varies from $\frac{1}{2}$ to $1\frac{1}{2}$ atmospheres. Here we do not exceed 10 lbs., that is, about two-thirds of an atmosphere, which is ample for the treatment of lung-diseases, and even before the pressure is reached complaints are made of headaches; as a rule, a pressure of $7\frac{1}{2}$ to 9 lbs. is sufficient to produce the ends we have in view.

A bath, or sitting, generally occupies two hours; half an hour being spent in gradually increasing the pressure, which is maintained for a whole hour at the maximum, and half an hour in gradually decreasing it to the minimum. The rate of increase or decrease should be 1 lb. in two or three minutes. The number of baths to be given must depend on the case, but at least a dozen are required to produce permanent improvement, and sometimes 30, 40, or even 100, are needed.

During compression the air increases in temperature, and this is, of course, more the case when the bath is occupied. During reduction of pressure there is sometimes a slight fall; but what is most marked is the deposition of moisture, which is seen on the glass windows during this process, and which, when the door is opened, often amounts to a mist in the chamber. This is, of course, due to the

quantity of moisture which the air was capable of holding in suspension at a high pressure being diminished when that pressure is reduced. The chief points to be aimed at in the management of compressed air-baths are:—

1. To increase and reduce pressure as gradually as possible.
2. To keep the temperature of the bath within reasonable limits, say between 60° Fahr., and 65° Fahr.
3. While increasing or maintaining the pressure, to provide for the escape of the used up and contaminated air.
4. If bad symptoms have arisen from increase or decrease of pressure, to reverse the process at once.

ON SOME POINTS IN THE ETIOLOGY OF PHTHISIS.

Read before the Medical Society of London.

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I do not propose in this short paper to travel over the whole of the ground involved in an inquiry into the etiology of phthisis; but I wish to take this opportunity of examining, a little in detail, certain statements that have been made, and certain criticisms that have been put forward, in recent contributions to this most important discussion.

I shall offer no apology for bringing this subject before this Society; for, until the truth, whatever it may prove to be, has been firmly established and generally admitted, as to the causation of a disease so widely spread and so fatal as phthisis, frequent and repeated inquiry becomes our duty. More especially is this the case, since the discovery by Koch of the bacillus of tubercle has lent additional interest and impetus to the inquiry whether phthisis does, or does not, originate in the direct or indirect communication of the exciting cause of the disease from one person to another.

The important practical question of prophylaxis is intimately associated with this discussion; and it is, therefore, urgently incumbent upon us to endeavour to ascertain clearly what is the truth in this respect.

Some of the criticisms to which I shall have to refer have had reference to the Report of the Collective Investigation Committee of the British Medical Association, on the Communicability of Phthisis; and, although the whole of the subcommittee entrusted with that inquiry accepted the responsibility of that report, I, as its author, am more directly concerned in defending it from misinterpretation.

One of the most considerable and interesting contributions to the inquiry into the etiology of phthisis that we have had of late years, is to be found in Dr. Andrew's Lumleian Lectures, delivered last year before the College of Physicians. I need not say that the argument which runs through these lectures is stated with great ability and ingenuity; that they are replete with interesting observations and important illustrations; and yet, I am forced to contend that the conclusion arrived at therein is altogether erroneous. As the authority of their author is so deservedly great, and as the occasion which called forth the expression of his opinion was also authoritative and influential, it becomes all the more important that we should examine in detail the doctrines thus set before the profession.

First of all, it is necessary to keep in our minds Dr. Andrew's admissions. "I am well content," he says, "to accept the bacillus of Koch as the essential cause of phthisis, and that, too, in the extreme form in which the doctrine has been stated to me by my colleague, Dr. Klein—namely, 'no tubercle without bacillus, no bacillus without tubercle';" and, subsequently, he shows with much force how "the hypothesis of a specific organism, present in all cases of phthisis, as its proximate exciting cause, clears up and reconciles the obscurities and contradictions which exist in every branch of the subject."

Having made this admission, the whole of his subsequent argument rests on the following assumption: that the bacillus of tubercle has an "independent" as well as a "parasitical" phase of existence; and the truth of this assumption has to bear the whole weight of the conclusion, that phthisis is neither directly nor indirectly communicable!

This argument may be thus briefly stated. Phthisis is always caused by a specific micro-organism, without which there can be no phthisis; but this organism can and does only give rise to phthisis in man and animals, when it exists independently of any "host," that is, when it is non-parasitic.

The author of this argument does not seem the least embarrassed by the consideration, that the hypothesis of the "independent" existence