on the fifth; and the third (a man who had sustained fracture of the ribs and humerus, and compound fractures of the arm, ankle, leg, and thigh) lingered seventeen days. The only statement Mr. Lister makes regarding his deaths from injury, is that they were not owing to hospital disease. In primary major amputations (Classes III and IV) six of the eight deaths were the direct result of railway accidents, and the whole six occurred within a few days of admission. Of the other two, one died from tetanus in five days; and in the last, an amputation of the thigh, the wound did well, but the patient succumbed on the thirty-eighth day to obscure intercurrent disease. I have already spoken of the deaths in Class V, which contains both of the only two fatalities from pyæmia in Dr. Borland's practice. Every surgeon is apt to have an unfortunate group of this sort. In Mr. Lister's practice, the excisions of the mamma are the unlucky series, he having two deaths from hospital diseases in thirty-eight cases. In "other operations" (Class VI), one death followed herniotomy. The bowel was gangrenous, having been strangulated five days. Death took place in seven days. In the other case, a man fell from a height on a paling-stob, the pointed end of which pierced the hip, and entered the pelvis by the great sacro-sciatic foramen. On forcibly withdrawing the stob, the gluteal artery bled profusely, and was ligatured. Gangrene from the injury set in next day, and proved fatal. In Class VII, the two deaths were owing to extensive burns. In abscesses, Dr. Borland had his solitary death from erysipelas. Another death was from lumbar abscess, on the nineteenth day, in an emaciated subject, sent in without hope of recovery. The remaining death in this class took place in a man who had a lumbar abscess forming, but unopened. Hemiplegia took place on the twelfth day, and from this cause the patient died, the abscess not having been interfered with. The only surface-lesion consisted in certain sores on the legs. In Class X, one death was from periostitis, and another from disease of the knee, in a hectic subject who lived almost entirely on stimulants. The knee was quite disorganised, and discharging from numerous sinuses. A series of large abscesses formed along the thigh, and the patient was never fit for operation. In Class XI, "other cases", a tramp died on the eleventh day from exhaustion, while both legs were sloughing off, owing to gangrene caused by exposure. The last case was admitted for traumatic erysipelas, which ended fatally. Such a case would not, I presume, have been allowed to enter Dr. Cameron's or Mr. Lister's wards. In a sentence, therefore: of the twenty-five deaths, seven occurred within four days, another six within eight days of admission; four chronic cases were sent in simply to be attended to on their death-beds; three died from hospital diseases; and one each from tetanus, hemiplegia, periostitis, severe general injuries, intercurrent disease, and erysipelas which arose previously to admission.

I have thus described what are, so far as I can discover, the best general results, covering a lengthened period of time, that have ever been recorded in the history of British hospital surgery. And the work has been accomplished in a manner totally at variance with that system which its advocates hold to be the best method of surgical treatment.

Finally, as to Listerism, Dr. Borland's position simply is, that he has never needed to adopt it. The above results have been obtained entirely without its aid; and, until distinctly greater successes have been recorded from other systems, he is justified in continuing to follow out a practice which is the matured result of fifty years' surgical experience.

PULMONARY PHTHISIS TREATED ANTISEPTICALLY.*

By W. WILLIAMS, M.D., M.R.C.P.,
Physician to the Royal Southern Hospital, Liverpool.

THE use of inhalations, and even of antiseptic inhalations, in the treatment of lung-disease, dates from no recent period: remedies of various kinds thus employed are spoken of by very early writers. It would, however, be beyond the scope of my paper to attempt to trace from the earliest records to the present time the gradual development which this subject has undergone. My object rather to-day is to lay before this meeting certain clinical facts which I have gathered while making an endeavour—with what success you will be able to judge—to bring the principles of Professor Lister's antiseptic method to bear upon the treatment of cavity or abscess of the lung. It is not so much, then, to the impregnation of the inspired air with vapour, as its purification, that I wish to draw attention.

Before entering upon the subject before me, I will make a very few

remarks upon some of the pathological changes which lead up to the disease in question.

Unlike acute pneumonia, from which recovery is, in favourable cases, complete, chronic or subacute inflammation of the lungs, in whatever way it may arise—whether as the relic of a previous acute attack, or of an attack of catarrhal pneumonia, or as the result of embolic arrest in the pulmonary capillaries (a view of the causation of phthisis at present in some favour)—tends towards the changes in the lung which are the precursors of phthisis, or, at all events, of some of the more chronic varieties of this disease. Accompanying it are found the same histological changes that are associated with this process elsewhere—a migration of leucocytes takes place, to invade all the pulmonary structures; the blood-vessels are surrounded, compressed, and their efficiency as circulating channels is damaged; the smaller tubes are, in their turn, similarly affected; while the alveolar walls are themselves invaded, thickened, and suffer a loss of elasticity. These, the immediate effects of inflammation, are aggravated to the utmost when the inflammatory products undergo the ultimate connective tissue transformation, with subsequent contraction and consolidation. This change, however, except towards the circumference of the diseased spot is, we are taught, by no means that which invariably takes place; much more frequently, towards the centre of the patch, the tendency will be to supuration and abscess, and the advent of this result will no doubt be hastened or postponed, according to whether the particular case has the acute or chronic characteristic most developed; but, an abscess once established, systematic infection, with rigors, fever, sweats, rapid wasting, and, what is of far greater importance, the setting up, by means of emboli disseminated by parts already affected, of foci of similar disease at a distance in the same, or in the opposite lung, are liable to take place. This is a mode of ingravescence which undoubtedly prevails, and, indeed, forms the principal features of most, if not all, cases of advanced phthisis; and that the study of it forms the surest guide to successful treatment is, I think, no isolated opinion. The patient, although he may have every possible attention—the best of nursing, the most nourishing of diets, given with the most approved regularity—cannot possibly derive the benefit which would, under more favourable circumstances, be secured him by such means, so long as suppurating cavities containing septic pus are allowed to exist in the lungs, constantly exercising their pernicious influence on the blood, preventing even the proper assimilation of the nourishment of which he stands in so much need.

The surgeon, with the resources at present under his command, has no difficulty in obviating the occurrence of the above untoward contingencies; and it will be my endeavour to show with what success I have been able to employ in the treatment of cavities in the lungs the means all but infallible in their application to external wounds.

It is a principle of treatment now universally recognised, that an abscess must be freed of its contents, kept empty by free drainage, and insulated or protected by antiseptic media from the septic influence of the surrounding atmosphere. These conditions being duly fulfilled, experience amply proves that any constitutional disturbance which has already appeared may very well be allowed to take care of itself, as under these circumstances the local lesion will quickly cease to be anything more than a local lesion.

Free drainages from abscesses or cavities in the lungs is undoubtedly in by far the majority of instances not to be secured; we know that they owe their most characteristic features of being ripe sources of systemic infection, or septicæmia, to the fact of their contents being retained while exposed to the septic influence of the air breathed; and the partial discharge that does take place is but periodically produced by the compression which the lung experiences during coughing—a method of evacuation that suggests to one's mind an attempt being made to cure the abscess by squeezing out the contents instead of providing, in addition to antiseptic protection, an efficient opening for a spontaneous and thorough drainage. For this reason, it will appear that all the conditions favourable to the complete carrying out of the Listerian method do not ordinarily exist here. One essential to the system—free drainage—we have seen to be frequently absent; but while admitting the full significance of this fact, we are, I think, bound to confess that the condition which is applicable is scarcely the least important of the two. No one, for instance, would deny antiseptic protection to a suppurating cavity because he was unable to empty it; and simply for that reason, would not a suppurating cavity in such a state, and with the risk of septicæmia which especially attaches to such a state, rather call for this guard against by far the worst accident that can arise?

From the time when, more than two years ago, I first attempted to bring the antiseptic system to bear upon chronic phthisis, I have become more and more convinced that it is the only treatment which promises to fulfil all the requirements of these cases.

In the ordinary application of Professor Lister's system, the fact is

* Read before the North Wales Branch.

recognised that carbolic acid, except to rid the wound in the first instance of septic germs, is not a good application. So far as the raw surface is concerned, it is irritating; and to counteract this drawback a piece of prepared oiled silk as a protective is invariably placed underneath the carbolised pad. To a certain extent, air circulates through the covering of gauze; and air purified by the filtration which necessarily takes place is, therefore, in constant contact with the surface of the wound, and with the discharge which lubricates that surface. Have we not, I will ask, an exact parallel to this in the application of the same principle to the lungs? I believe we have, even to the preliminary cleansing of the foul surface alluded to.

Respiration ensures the circulation of air to perfection; while as it passes through the respirator it is not only purified, but it also becomes impregnated with a certain amount of the carbolic vapour given off by the gauze. The quantity inhaled of this vapour may, for any single inspiration, be quite insignificant; but when multiplied by the number of inspirations made in only a few hours, it does not seem difficult to believe that the amount would soon be sufficient to accomplish the disinfection of all the purulent cavities already in communication with bronchial tubes. That this end is actually gained, and even rapidly gained, my experience certainly tends to prove; and I find moreover that, on the disappearance of odour, it requires subsequently the presence of very little carbolic acid on the gauze to keep the expectoration permanently free from fœtor, as though the ulcerated surfaces having been rendered aseptic, all that remained to be done was to ensure against their reinfection by the inspiration of only pure air, and also to obviate the risk of creating irritation by breathing that which contains but a minimum quantity of suspended carbolic vapour.

So far as my observations go, they also tend to show that foetid pus from the lungs is not so rich in bacteria as putrid matter from some other regions; and this may be the explanation of the facility with which odour disappears under this mode of treatment: there being but few organisms to kill, the work is soon completed.

Three of the six slides which I show to-day have been prepared from patients before, and the remainder after, treatment. You will observe that while they all contain micrococci, only the former show rod-bacteria. I have only been able to get these few specimens ready in time: that they must not be allowed to lend any support to the clinical facts, must be evident. The matter in each case was taken from recent expectoration, which was immediately dried, stained with methyl-aniline-violet, and mounted in Canada balsam. Although the power employed—an eighth objective—is a comparatively low one for the purpose, yet with the aid of Abbe's condenser the micro-organisms are very fairly shown.

With regard to the mechanism adopted, the following is a description of the kind of respirator I find to answer best. Over a wire framework, shaped like a respirator, made to cover both the mouth and nose, two or more layers of ordinary antiseptic gauze are stretched; along the concavity inside, a narrow strip of sponge is placed, and, finally, the whole is fitted accurately to the face by a circumferential pad made of gutta-percha tissue, stuffed with cotton-wool, or folded lint, which is more manageable. Antiseptic gauze in the dry state gives off a vapour of carbolic acid. Bearing in mind, however, the large amount of air that would in ordinary breathing pass to and fro, it will be very evident that this comparatively small piece of gauze must soon become exhausted, and require recharging; this is secured by the whole being dipped every half hour or so at first, afterwards less frequently, into a watery solution of carbolic acid of the strength of 1 in 40; the gauze is, besides, renewed every two or three days. These respirators or dressings are worn as constantly as possible; in fact, the only occasions on which their temporary removal is permitted are during a meal, for the purpose of expectorating, and for that of dipping. Taking into account the apparent inconvenience, it is a little surprising with what readiness even hospital patients fall into the way of wearing these appliances with the greatest constancy both day and night. It is quite the exception to hear complaints of any kind.

The following cases present a fair example of the results I have met with.

CASE I.—April 3rd, 1879. J. O., sailor, aged 19, had three months' illness, originating in exposure. There was consolidation, and a cavity affecting the left apex. He had purulent bronchitis throughout both lungs, very great emaciation, rigors, sweating, and diarrhoea. The temperature was 104° at night, and 99° in the morning. Expectoration amounted to thirty ounces in the twenty-four hours—purulent, and very offensive. On the seventh day from the commencement of the treatment, the cough and symptoms were generally much improved; expectoration ten ounces, and free from smell. At the end of four months he left the hospital for his native country (Norway) in much improved health; expectoration two to three ounces, mucoid.

CASE II.—December 8th, 1879. J. P., joiner, aged 43, had had four months' illness, commencing with cough and repeated attacks of hæmoptysis; emaciation followed, with rigors and night-sweats. Percussion over the right apex showed dullness to exist as far down as the fourth rib; a large cavity was also present here; coarse crepitation, with increased vocal resonance at the right base. The left lung was fairly healthy. The expectoration was five ounces in the twenty-four hours, nummular. The bowels were mostly loose; temperature 100°. He had frequent attacks of pain in the right chest.

December 18th. Weight 9 st. 11½ lb. He had slight hæmoptysis during the night.

January 8th. Weight, 10 st. 2 lb.; January 16th, 10 st. 7 lb.; January 23rd, 10 st. 9 lb.

March 5th. Weight, 11 st. 6 lb.; so far as I could gather, his normal weight.

This patient was discharged cured on March 8th, 1880. I have seen him up to the last three weeks; he continues free from relapse, though the cavity still exists, and he follows his employment.

CASE III.—November 7th, 1880. W. C., a labourer, aged 19; height 6 ft. 2 in., weight 8 st. 11 lb., slight build; five months' illness. He first had a cough and pain in the chest; afterwards thick expectoration, occasional attacks of hæmoptysis, great wasting, sweating, etc. The thorax was flattened on the left side above; respiration here was cavernous, and accompanied by gurgling; pectoriloquy and cracked-pot percussion-note were marked; dullness extended all over the left front and upper third behind. The left lung contained several cavities. The heart was displaced upwards, and to the left. There was puerile breathing on the right side. Expectoration amounted to about six ounces, nummular, and occasionally very offensive. Temperature 104° at night, and sometimes a little higher. He was ordered a carbolised respirator.

He left the hospital, after four months' treatment, for the Convalescent Institution at Woolton. Expectoration was mucoid, a few drachms only; cavities dry. He had not had hæmoptysis for a month, and then only a slight tinge; weight, 9 st. 6 lb. He was able to go about as usual. One day, a month ago, this patient called upon me, when I learnt that he had remained pretty free from cough, and was still improving. The condition of his chest seemed to be precisely what it was on his first leaving us.

ANTISEPTIC TREATMENT OF LUNG-DISEASES.

By J. CARRICK MURRAY, M.D.,

Physician to the Northern Counties Hospital for Diseases of the Chest.

I WAS pleased to see, in the JOURNAL of July 16th, the memoranda of Mr. S. Wilson Hope and Dr. F. P. Atkinson. They will have the good effect of keeping the antiseptic treatment of chest-cases before the profession. This mode of treatment is probably making a greater stir in the profession than appears; for Dr. Coghill has no doubt had, like myself, many private letters of inquiry.

On May 31st, the medical officers of the Northern Counties Hospital for Diseases of the Chest received, per order, a number of Dr. Coghill's inhalers, made by Messrs. Maw, Son, and Thompson; also some of the inhaling mixture recommended by Dr. Coghill. The inhalers have been in diligent use since, with satisfactory results; the amount of sputa having in each case lessened. Patients who commenced to cough and spit at four o'clock in the morning can already lie until rising time without coughing. Some of them complain that they do not get the phlegm up so easily as before; but I am of opinion that the sufferers continue to cough more from long habit than from real necessity. I find that our inhaling patients observe the strong smell of the antiseptic in their sputa, and that half an hour twice a day appears sufficient to use the inhaler; also that twenty minims dropped on at once are enough for two days' use. More has been found too irritating to the glottis in the cases in which we have used it.

I prefer surgeons' lint, doubled, to cotton-wool or tow; and have had made for me an inhaler more elegant, a little, than Dr. Coghill's. It fastens by a broad India-rubber band at the back of the neck; this does not hurt the ears. The outer perforated plate is hinged, and therefore more easily manipulated. The makers are Messrs. Henry Aitken and Co., Bishophill, York; the price, five shillings each.

My conviction is, that medicated inhalation might be used with benefit in more diseases than Dr. Coghill enumerates: e.g., in hay-fever; influenza; incipient phthisis; or where a husband sleeps with a consumptive wife, or *vice versa*; hæmoptysis between attacks; chronic bronchitis, with profuse, inspissated, or difficult expectoration; asthma from loss of lung-tissue; so-called laryngeal phthisis; circumscribed