investigation has proceeded to a further stage, it is being found that it is not the micro-organisms themselves that are poisonous to man, but the products to which they give rise under certain conditions. Those, therefore, who have the charge of the public health must now trim their sails anew, and henceforth the study of this matter enters upon a new phase, which is chemical in its character. We must now seek to discover under what conditions and from what substances various micro-organisms elaborate poisonous substances, and also to determine the chemical composition of these products.

In the meantime, physiologists and microscopists must abandon their old methods of testing disinfectants. It will no longer serve, in order to ascertain the value of a disinfectant, to take a particular colony of micro-organisms and expose them to the presence of the disinfectant, with the view of ascertaining if they are killed thereby, by means of subsequent attempted isolation and culture; nor will it suffice to expose a colony of micro-organisms to the presence of disinfectants, and, after isolation, to inoculate animals therewith. On the other hand, the infectants must be introduced into the bodies of animals simultaneously with, and in the presence of, the disinfectant; and if the specific disease do not follow upon the inoculation, the disinfectant is a reliable one for that particular set of circumstances.

After all then, we fall back upon old lines of policy, and must have recourse to chemical substances which act on the one hand as antiseptics, thereby preventing micro-organisms from multiplying and producing poisonous substances (real infectants), and substances which by chemical changes, such as oxidation and chlorination, act in a destructive sense to the same chemical poisons if they happen to be already in existence. Indeed, the idea of employing some active chemical poisons, such as carbolic acid, sulphurous anhydride, absolute alcohol, creasote, chlorine, and corrosive sublimate, for the treatment of diseases like cholera, typhoid fever, and dysentery, is, of course, absolutely out of the question; and the only hope is that a non-poisonous antiseptic, such as "sanitas" fluid, which may be administered internally, may be found to supply the means, that is urgently called for, of combating such fearful diseases.

Of the nature of the chemical poisons referred to in the preceding paragraphs as constituting infectants related to specific diseases, I can only suggest that they are derivatives of albumin produced by a series of chemical changes involving hydrolysis; and in connection with this subject, the investigations of O. Nasse and P. Schützenberger have already paved the way for the comprehension of results which may be expected to speedily attend new researches into the chemistry of diseases. I particularly refer to such investigations as those conducted by Selmi with reference to pathological bases formed in the tissues, and to the experiments of the same investigator, Paterno, and others, concerning the formation of ptomaines, and the alkaloids produced in putrefaction. It may be remembered that Selmi, suspecting that in various diseases, poisonous substances are formed in the tissues, and that these determine the death of the patient, analysed the urine of patients affected with progressive paralysis, miliary fever, and rheumatic tetanus, and found in all cases that poisonous bases were present. One of these bases resembled nicotine in its properties, while another had the odour of conine, and a third substance (amongst others) was obtained which was white and crystalline, and was capable of determining the conversion of starch into glucose.

These facts, and the well ascertained formation of poisonous alkaloids amongst the products of putrefied albumin, not to speak of what is known regarding the physiological action of alkaloids generally, including abrin (from jequirity-seeds), may all be regarded as preparatory evidence of the production both in and out of the human body of highly poisonous substances, or infectants, by the agency of micro-organisms.

In conclusion, I wish to add that I am now carrying on a series of investigations concerning the chemical history of some micro-organisms; and I am confident, from the results already obtained, that they will lend strong confirmation to the views I have herein expressed concerning the relations of micro-organisms to disease, and the qualifications of disinfectants.

THE LATE DR. TIBBITS.—The Board of Management of the Bradford Infirmary, at their meeting on the 1st instant, passed the following resolution: "That the Board of Management desires to place upon record its deep regret at the loss it has sustained in the death of the late Dr. Tibbits, who, to his varied professional acquirements, conjoined a deep sympathy with human suffering, and rendered invaluable service to this institution and the community at large. The Board, at the same time, tenders its sincere condolence with Mrs. Tibbits and her family in the irreparable bereavement they have sustained."

A NEW INHALER, WITH REMARKS ON OPEN ANTISEPTIC INHALATION.

By JOHN WARD COUSINS, M.D. Lond., F.R.C.S.,
Surgeon to the Royal Portsmouth Hospital.

THE advocates of antiseptic inhalation are quite unanimous as to the necessity of employing it with great regularity and perseverance over a long period; but there is much diversity of opinion as to the method of application, and the contrivance best adapted for the treatment. The experience of most practitioners is, however, clearly in favour of the direct inhalation of dry vapours, and a great variety of instruments have been constructed for the purpose, for the most part modifications of the original respirator-inhaler suggested by Dr. Sinclair Coghill in 1876. The simplest forms of apparatus are now almost universally preferred, as they are more comfortable to the patient and more readily tolerated during prolonged application. Some inhalers are too heavy, and cause a feeling of oppression, and, sometimes, even difficulty of breathing. Others are objectionable by pressing on the face, and causing irritation of the skin. It is my opinion that all close oro-nasal respirators and complex instruments present no real advantages, and that they must soon fall into disuse, as their employment is seriously irksome to many patients. An inhaler ought to be a very light mechanical contrivance, especially designed to permit the voluntary introduction of medicated vapour by full inspiration; at the same time securing the freest possible access of air, so that the continuous and daily practice may be rendered both endurable and pleasant.

The small instrument represented in the engraving, appears to me to possess all these essential qualifications. It consists of a vulcanite receptacle (Fig. 1) for holding the little pledget of cotton-wool upon which the inhalant is dropped. The wire suspends the inhaler, and serves also as a compressor of the nose. When used for nasal inhalation, one of the balls (Fig. 2) must be selected, and half only of its circumference ought to enter the nostril. During oral inhalation, another ball is used, or the neck of the inhaler can rest against the upper teeth. The Figures 3 and 4 explain the methods of adjusting the instrument. By merely opening and closing the mouth, the patient can regulate the entrance of the antiseptic vapour into the lungs. It is extremely light, and causes no fatigue or oppression, and it does not require to be taken off during coughing and expulsion of the sputa. I am much indebted to Messrs. S. Maw, Son, and Thompson for the care they have bestowed upon the manufacture of my inhaler, and I am glad to add that it can be obtained from that firm at a very moderate price.

The following table exhibits the respective weights of some of the best known inhalers now in general use.

	Drachms.	Grains.
Coghill's metal inhaler...	8	45
" nickelled inhaler ...	7	19
" celluloid " ...	3	27
Mackenzie's metal " ...	15	40
" nickelled " ...	18	52
" celluloid " ...	8	29
Roberts's nickelled " ...	9	3
" metal " ...	7	2
Burney Yeo's perforated zinc inhaler ...	3	40
Ward Cousins's new antiseptic " ...	1	12

The inhaler which I have now described is a very convenient little instrument for the treatment of chest-disorders by inhalation. It is my opinion that the cumbrous instruments which are employed by many, with the intention of filtering the inspired air, are practically useless, and that their persistent use exercises a baneful influence on

the surroundings of many who are daily striving to protect their lungs with antiseptic inhalations. The constant application of a close inhaler fosters the common prejudice against fresh air and sufficient ventilation; and the treatment degenerates into a struggle between germs within, and germs without—hopelessly carried on by breathing through an uncomely mask, and by confinement in a close and stuffy atmosphere. Depend upon it, every remedial agent employed in the management of chest-disorders must be positively injurious to the patient whenever it distracts the attention from the common and hygienic measures which are so essential to the general improvement of the system, and the increase of the vital resistance of the whole organisation.

Now, in whatever light the speculations are regarded concerning the action of inhalations as destroyers of bacilli or as protectors against floating germs, it must be admitted that this treatment has made remarkable progress, and has also been practised with very great success. What, then, is the *modus operandi* of antiseptic inhalations in pulmonary affections? Surely the action of these remedies admits a very simple explanation. They are valuable not only in the treatment of phthisis in all its forms, but they are fortunately equally applicable for many other chronic disorders of the chest, and their judicious administration is certainly followed by very considerable relief. The vapours are carried with the inspired air deeply into the passages, and are there absorbed by the moisture of the respiratory surface; thus, by direct application, they purify the air in the remote portions of the lungs, and cleanse the mucous membrane generally by preventing decomposition in the fluids, and stimulating more healthy secretion. In chronic bronchitis, in bronchorrhoea with dilated bronchi, and in emphysematous affections, the efficacy of the treatment is beyond dispute; for, by assisting the discharge of the expectoration, and by delaying the septic changes which occur within it, they remarkably modify the disorder at the very seat of its activity.

In phthisis, these topical remedies have proved also powerful auxiliaries to general treatment. They check decomposition in the secretions, and aid in the evacuation of the infectious materials, which are the direct products of the disintegration of the pulmonary tissues, and which, by the processes of absorption and diffusion, often establish new centres of disease.

But apart altogether from any specific effect of the antiseptic vapours, it must be admitted that the act of continuous inhalation exerts a very salutary influence by stimulating full and repeated expansion of the lungs; and the forced activity of these organs is in itself an important factor of the treatment.

The value of free inspiration, and the part it plays in the successful application of antiseptic inhalation, has scarcely received the general recognition to which it is justly entitled. Many years ago, the late Dr. Ramadge warmly advocated the use of an inflating-tube for the simple purpose of expanding the lungs, and stimulating their functional activity by voluntary effort.

In phthisis, these organs are very imperfectly expanded. The sputa collecting in the passages obstructs the aerial movements, and some portion of the air, only partially changed, becomes imprisoned in the remote parts of the pulmonary tissue, and thus the healthy balance between inspiration and expiration is disturbed, the breathing becomes shallow; at the same time, the gradual contraction and emaciation of the thoracic parietes are seriously accelerated. Now, it appears to me, that much of the success which has followed the introduction of antiseptic inhalation is due to persistent expansion of the lungs by forced inspiration; and certainly this novel and fashionable system corroborates the value of the mechanical method practised by Dr. Ramadge. His notions respecting the antagonism between emphysema and phthisis have now almost passed into oblivion; but his special treatment of utilising functional activity as an instrument for arresting the progress of tubercular disease, is surely now receiving a remarkable acknowledgment in the revival of respirators and local medication. The new treatment is, in fact, a close repetition of the old mode of inflation, with the addition of an antiseptic vapour to the inspired air; and the beneficial effect produced by its persistent employment can, in a great part at least, be fairly attributed to the expansion of the chest in full and forced inspiration; for this not only assists in maintaining the volume of the lungs, and in stimulating the activity of those portions of their structure still free from the elements of tubercle, but it also favours the circulation itself, and helps on the processes of local and general nutrition by which a vital resistance is developed, restraining the progress of the disorder, and powerfully contributing towards its final arrest through the contraction and limitation of the local disease.

In conclusion, open antiseptic inhalation has been considered in this paper only with reference to the treatment of diseases of the chest;

at the same time, it admits of a far wider application, and is a very convenient method of employing the inspired air as a medium for the introduction of deodorising vapours in many other diseases. It has been used with advantage in chronic laryngeal affections, and also by patients labouring under habitual fetor of the breath. In ozena and other nasal and naso-pharyngeal disorders, I have found it of great utility, in conjunction with the frequent application of astringent and disinfecting solutions, for cleansing the unhealthy surfaces.

SACCULAR DILATATION OF THE URETHRA.

By LAWSON TAIT, F.R.C.S.,

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IN October 1875, I published the following case in the *Lancet*.

Mrs. B., mother of a large family, had suffered for many years from a protrusion, about the size of an egg, from the vulva, which was excessively painful. She passed large quantities of fetid pus from the bladder. The protrusion looked like an ordinary cystocele, save that it was quite irreducible, was very hard, and, when it was firmly pressed, a large quantity of fetid ammoniacal pus escaped from the orifice of the urethra. If this pus got on the fingers, it made them smart. The sound readily passed into the cavity of the protrusion from the urethra. It was clearly, therefore, not an ordinary cystocele, but probably a sacculatation of the urethra, and the only benefit likely to be obtained was by its removal. She was placed under ether, and the lower half of the protrusion was removed by a cut of the scissors; and this opened into a large cavity lined with thickened corrugated mucous membrane. It had an opening into the urethra large enough to admit a No. 9 or 10 catheter; the opening being situated in the lower wall of the urethra, and about halfway between its orifice and the entrance to the bladder. The whole of the mucous lining of the sac was removed, and the vaginal mucous membrane was closed over the cavity by deep sutures. The wound healed rapidly, and the cure is now complete.

In May 1876, M. Gillette of Paris published, in the same journal, a case very similar in external appearance, and probably in its relations to the urethra; but he did not define accurately, in his description of the operation, the relations which were discovered in the entrance to the sac from the urethra. Although I opened correspondence in the journal, I did not elicit the information which was necessary in order to determine whether M. Gillette's case was precisely like my own.

Until the case that I described in 1875, I had never seen anything of this kind, nor had I met with any description of it, and, until the beginning of this year, I had never seen another case like it, nor have I come across, in my readings, any allusion to further experiences of this peculiar condition save that of M. Gillette. But, as a curious illustration of the strange series of coincidences which are constantly occurring in surgical practice, since the beginning of this year I have had no fewer than three cases precisely similar to that which I previously narrated. The symptoms in all three cases were precisely alike. The patients were constantly troubled with an escape of fetid ammoniacal purulent urine, causing much irritation, discomfort, and annoyance from the smell. The escape did not occur during micturition—that is to say, the urine passed voluntarily was usually perfectly clear and sweet; but, either with the least strain of micturition, or pressure, or on a sudden change of position, and at other times inexplicably, this objectionable fetid urine escaped without the patient knowing anything about it, until she found herself wet and uncomfortable. When examined, a tumour, apparently continuous with the neck of the bladder, was found to present itself between the lips of the vestibule, closely resembling an ordinary cystic vaginocoele, save that it was tender on pressure. When it was pressed, the characteristic fetid and purulent urine escaped by the meatus. When a catheter was passed into the bladder, keeping the point well up on the roof of the urethra, it passed easily into the cavity of the bladder, and perfectly clear urine was withdrawn. When, on the contrary, the point of the catheter was passed, with slight pressure, along the floor of the urethra, it entered the cavity of the tumour, and the putrid contents of the latter escaped. The patients were respectively of the ages 23, 55, 32; and were operated upon the dates February 10th, February 13th, and March 27th. The details of their operations and all the conditions found are practically identical, save that, in the second case, the tumour was quite as large as an egg, whilst in the first and third it was not much more than half that size. The proceedings that I adopted were precisely those described in the *Lancet* for my first case. I put a catheter in the urethra, in order to display the aperture and