potash of Class No. III or effete material; as, while in muscular tissue these two substances occur precisely in the right proportions to form pyrophosphate of potash (a very remarkable and interesting result), no such proportion is found to exist between the two corresponding substances in pulmonary tissue, which is clearly shown thus.

	Muscular Tissue.	Pulmonary Tissue.	Theory.
Phosphoric acid..	(0.563) 42.4*	(0.058) 11.4	43 } Pyroph. of
Potash	(0.764) 57.6	(0.451) 88.6	57 } potash.
	100.0	100.0	100

Hence in pulmonary tissue the phosphoric acid and potash effete are far from existing in a proportion which will allow their combining into a crystalloid. If my view be correct, it is necessary, however, that these two substances should become crystalloid, so as to allow their elimination by physical diffusion; and there is a very satisfactory way of accounting for the above result.

I formerly explained how the expiration of carbonic acid from the lungs was due to the diffusion of the gas from blood through the moist membrane of the pulmonary vesicles, and its final evolution together with moisture. On its way through the lung-tissue, carbonic acid must combine with that portion of the potash present, which would otherwise occur in the free state, converting it into a crystalloid, and therefore diffusible, compound. Hence it may be concluded that, in the process of nutrition of the pulmonary tissue, the potash is mostly eliminated as carbonate instead of pyrophosphate. The correctness of this view is much strengthened, if not proved, by the fact that pulmonary tissue in a state of tubercular consolidation and softening, and therefore unfit for respiration, was found to contain phosphoric acid and potash effete nearly in the proportions of a crystalloid pyrophosphate, as in the case of muscular tissue.

[To be continued.]

A PLAN FOR FACILITATING THE REDUCTION OF STRANGULATED HERNIA BY TAXIS.

By W. C. B. FIFIELD, M.D., M.R.C.S.L., Surgeon to City Hospital, Boston, U.S.A.

I NOTICE in the BRITISH MEDICAL JOURNAL for December 23rd, 1871, an article by Dr. P. C. Smyly, entitled, "A Plan for Facilitating the Reduction of Strangulated Hernia by Taxis." It is said that there is nothing new under the sun. Dr. Smyly's paper is another proof of the truth of this saying. I have for years been familiar with the process, which is often successful. In *Braithwaite's Retrospect* for 1857, there is the following quotation from Baron Seutin. The only difference is that Baron Seutin passed the finger in front of the intestine or omentum, and also used more force than Mr. Smyly describes. "*(New Mode of Reducing Strangulated Hernia.* By Baron Seutin). Baron Seutin declares that with this mode of reducing strangulated hernia (which he has now practised for twenty years), he hardly ever in his large practice finds it necessary to have recourse to an operation. The patient is laid upon his back with the pelvis raised much higher than the shoulders, in order that the intestinal mass may exert traction on the herniated position. The knees are flexed, and the body slightly turned to the opposite side to that on which the hernia exists. The surgeon ascertains that the hernia, habitually reducible, cannot be returned by moderate and continuous taxis. He next seeks with his index-finger for the aperture that has given issue to the hernia, pushing up the skin sufficiently from below, in order not to be arrested by its resistance. The extremity of the finger is passed slowly in between the viscera and the herniary orifice, depressing the intestine or omentum with the pulp of the finger. This stage of the procedure demands perseverance; for at first it seems impossible to proceed. The finger is next curved like a hook, and sufficient traction exerted on the ring to rupture some of the fibres, giving rise to a cracking, very sensible to the finger, and sometimes to the ear. When this characteristic crack is not produced, the fibres must be submitted to a continuous forced dilatation, which, by distending them beyond the agency of their natural elasticity, generally terminates the strangulation. This procedure is more (less?) applicable to Gimbernat's ligament, the hooking and tearing of which are more difficult than in the case of the inguinal ring. Considerable strength has sometimes to be exerted, and the index-finger becomes much fatigued. When, in consequence of the narrowness of the ring, the

finger does not at once penetrate, it is to be pressed against the fibrous edge, and inclined towards the hernia. After a time, the fibres yield and the finger passes. When the finger becomes fatigued, it is not to be withdrawn; but it is to be supported by the fingers of an intelligent assistant, who seconds the action it is desirable to produce. In inguinal hernia, the traction should not be exerted with the finger upon Poupart's ligament, but in a direction from within outwards, and from below upwards, by which the aponeurotic layer between the two ligamentous pillars constituting the inguinal aperture is easily torn through. The ring is then enlarged by this tearing, just as if it had been divided by a cutting instrument, or largely dilated, and reduction takes place easily by performing taxis in a suitable direction. The mobility of the skin, its laxity in parts where hernia prevails, and its extensibility greater in proportion to its thinness, and to the absence of a lining of fatty cellular tissue, by allowing the sliding and the thrusting of this membrane in front of the finger it cushions, affords protection to the intestine from all immediate contusion.

"When the strangulation is induced by the issue of a considerable mass of intestine, or an accumulation of fecal matters, it is desirable, first, to disengage one of the extremities of the noose, and to seek to expel the gas or fecal matters by moderate pressure, in order to facilitate the reduction of the tumour. In a few cases in which the finger cannot be introduced, a small incision may be practised in the skin, and the handle of a spatula or any blunt instrument may be passed in by separating the cellular tissue. Pressing this against the border of the ring, while avoiding the intestine, this orifice may be eroded or dilated without danger. The greater the resistance offered by the aponeurotic fibres, the greater will be their tension, and the more easily will their laceration be produced. As a general conclusion, it may be laid down that the facility and promptitude of this procedure, and the immunity that attends it, ought to diminish the gravity of the prognosis of strangulated hernia by rendering the circumstances under which recourse need be had to an operation quite exceptional. Such exceptional cases will be found (1) in old irreducible hernia; (2) when the strangulation in inguinal hernia occurs at the internal ring. Generally the external ring and the inguinal canal are large, and allow the easy penetration of the finger; and then this method is applicable, and the rupturing or dilatation of the internal ring should be attempted, and the manœuvre is rendered easier by the fact that in these cases the canal is much shortened, and the two rings approximated. If, however, the external ring be too narrow to admit the finger, an operation is required. (3.) When there are general symptoms of a gangrenous state of the intestine."

I have practised this method of Baron Seutin in one case very successfully.

ON A "RESIDUAL-AIR-PUMP" FOR EMPHYSEMA.

By HORACE DOBELL, M.D.,

Senior Physician to the Royal Hospital for Diseases of the Chest, etc.

MY friend Dr. Berkart recently described an instrument which he had invented for the purpose of better effecting the objects aimed at by the experiments of Drs. Hank, Hagel and Mader, of Vienna, in the treatment of emphysema of the lungs. The objects of these experiments and of Dr. Berkart's instrument were, "to reduce the intravascular pressure, and that resulting from it on the thoracic surface of the diaphragm," and to displace and replace the residual air stagnated in the emphysematous cells.

Dr. Berkart says, "With a somewhat bulky instrument, a modified Hutchinson's spirometer, which if safety is to be ensured, has to be worked by two assistants, Dr. Hank first used compressed air in croup and emphysema. Subsequently, he found that if emphysematous patients were allowed to expire into an atmosphere, the pressure of which was from four to eight inches of water less than that of the air, the relief they obtained was greater and more lasting than by the use of compressed air; and his brilliant results have been fully corroborated by Drs. Hagel and Mader. I therefore designed two instruments, and I have been using them for some time with the best results."

Being much interested in the treatment of emphysema, and fully appreciating the importance of the objects aimed at by Drs. Hank, Hagel, Mader, and Berkart, I at once induced Dr. Berkart to be kind enough to bring his instrument to the Royal Hospital for Diseases of the Chest, and to try it upon some of the numerous emphysematous patients who seek relief at that charity. By a set of inspiratory and expiratory valves communicating between an orinatal mask and an air-pump, the cylinder of which is suddenly exhausted at the instant when the patient completes an act of ordinary expiration, Dr. Berkart aims

* The proportions per cent. of phosphoric acid and potash effete in the four analyses of muscular tissue were as follows:

	I.	II.	III.	IV.
Phosphoric acid	43.8	43.7	43.7	40.4
Potash	56.2	56.3	56.3	59.6

at removing from the chest a certain volume more of air than would be evacuated by the patient's unaided expiratory powers. When every precaution is taken to adjust the mask hermetically to the face, to stop the inspiratory valve and to exhaust the receiver at the exact moment when ordinary expiration ceases, and to keep the patient from holding his breath at that instant, the instrument answers its purpose very well. But it is obvious that the exact adjustment of all these points is difficult and troublesome; the instrument is cumbersome and expensive; and although Dr. Berkart thinks that its use "for a quarter of an hour twice a day" will be sufficient, I do not myself expect that good would be effected without a very much more frequent repetition of the operation. It has appeared to me, therefore, that if good is to be done by exhausting the chests of emphysematous patients, it is a great object to place in their hands a simple, portable, inexpensive, instrument, with which they can carry out the treatment easily and frequently in the absence of the medical man.

With this view, I submit the accompanying drawings of a little instrument which I have contrived, and which has been nicely made by Messrs. Maw, of Aldersgate Street. I believe it completely answers the end in view; viz., to pump out the residual-air of the lungs, so far as that is possible, and I have, therefore, named it "A Residual-Air-Pump."

I do not pretend, at present, to produce any experience of the ultimate effects of the use of either Dr. Berkart's or my own instrument in emphysema. But my opinion is, supported by such experience as I have yet had, that by these means some assistance may be afforded to even chronic and aggravated cases; and that in recent cases, where the cells are over-distended but not yet deprived of their elastic properties, permanent curative effects may be expected from the frequently repeated use of such mechanical assistance as these instruments afford, combined with treatment for the removal of the causes of the over-distention of the cells.

To use my instrument, it is only necessary to put the pipe-end into the mouth, and to inspire and expire entirely through it, avoiding inspiring through the nostrils or sides of the mouth. This is easily done; but, to make it more secure, a little compressing clip for the nostrils, and a respirator-shaped plug for the sides of the mouth, are provided. The

Section showing the Valve.

Clip for Nostrils.

Dr. Dobell's Residual-Air-pump for Emphysema, with Respirator-shaped Plug for the sides of the Mouth, and Loops to pass over the Ears: ready for use.

instrument has but one valve, which is so constructed as to answer all purposes. It allows the freest possible expiration, but restricts inspiration to such an extent that, in from three to six respiratory acts, the expiratory and reserve air are quite pumped out, and the diaphragm has risen to the greatest height of which it is capable. The patient is then obliged to open the mouth and take a deep inspiration, which he does much more freely than he could before using the instrument, and with a distinct sense of relief and comfort. He then closes his mouth upon the pipe-end, and repeats the operation.

ON DISINFECTION.

By JOSEPH LALOR, M.D.,

Resident Medical Superintendent of Richmond District Lunatic Asylum, Dublin.

AT the present time, the subject of disinfection is one of peculiar importance; and, having occasion myself to consider it earnestly in connexion with the occurrence of some cases of small-pox in this institution, I beg to call the attention of the profession to some points which appear to me particularly worthy of special investigation.

Disinfection is very generally limited to clothes, rooms, furniture, and other such articles; the original source of the infectious matter—that is, the living subject—being often not submitted to any disinfecting process, or, if so, with means less effectual than in the case of dead matter. Amongst the means of disinfecting dead matter, it appears to me that at the present day dry heat at a high degree is the most relied on and the most trustworthy; and that, were it as practicable and safe to apply it at the requisite degree to the living subject, it would be, in all contagious diseases, the most effectual and desirable, so far as the external cutaneous surface of the body is concerned. This latter is a principal, if not the chief, original source of contagion. Suppose we take the case of zymotic diseases, which, from their great frequency as well as from other causes, are those to which I wish at present to direct attention. Assuming that the contagious matter on the cutaneous surface in small-pox, for instance, is the pus, crust, or scab; or in scarlatina, measles, and maculated typhus, the cuticular exfoliations; then the point to be considered is, how heat is to be applied so as to disinfect those matters. Though the contagious principle is attached to the living body in the cases which we are considering, there may be a difference of opinion as to whether it is effete or dead or a living organism, such as a cell or sporule; and the theoretical question on either supposition would then arise, whether the degree of temperature required for disinfecting them would be the same degree as is requisite in clothes and such other dead matters in which a temperature of several hundred degrees is recommended, or whether a different and perhaps lower temperature, according to the nature of the contagious organism, would be sufficient. Were it necessary to raise the temperature to that degree recommended at least, though not universally admitted to be necessary, in the case of clothes, etc., then the question, practically, could not, I think, be entertained; for I do not expect, in my time at least, to see means devised by which the whole cutaneous surface of ordinary living human beings can with safety be exposed to a temperature of 300, 400, 500, or 600 degrees during the time necessary for disinfection. I am disposed to hope, however, that the question to be considered is not so difficult, but that it lies within such limits that a practical solution of it might be obtained in our own time by careful consideration and experimental investigation.

In the *Cyclopaedia of Practical Medicine*, page 626, it is stated that Dr. Henry of Manchester found "that the cutaneous matter of cow-pox, scarlatina, and typhus fever, as it exists in clothes, etc., may be rendered inert by being subjected to temperatures varying from 120 to 204 deg. Fahr. for certain periods of time." In Carpenter's *Physiology*, fourth edition, page 640, it is stated "that many instances are on record of a heat from 250 to 280 deg. being endured in dry air for a considerable length of time even by persons unaccustomed to a particularly high temperature." The ordinary living human subject, therefore, may be considered capable of enduring the degree of heat stated by Dr. Henry to be sufficient to render inert the contagious matter of cow-pox, scarlatina, and typhus fever, as it occurs in clothes and such like matters.

But in the case of clothes and such like matters, treated according to Dr. Henry's method, every particle of the clothing and of the inherent contagious matter has been raised, as a matter of course, to the required degree of heat. Now it appears uncertain that, in the case of contagious matter attached to the cutaneous surface of a living being, such matter would or could be raised to the required degree of heat by the exposure of the living being itself, even in a close chamber, to that temperature. In the case of the living skin or cuticle, I do not suppose it possible to raise it to that temperature consistently with the retention of its living healthy organisation. The theoretical point to be ascertained is, can the contagious principle on the cutaneous surface be raised to the required temperature? As a practical question, the point to be considered is, will the exposure of a living being to the degrees of temperature and in the way recommended by Dr. Henry, so as to disinfect clothes, etc., be sufficient to disinfect the cutaneous surface of such living beings? From the statements made by Dr. Carpenter, it would appear to be quite safe to submit living beings—let us say persons convalescent from such zymotic diseases as already specified—to the requisite degree of temperature for the required period of time. So