entirely a lung which is already almost incapable of function is physiologically a *vile damnum*; but from the point of view of restraining the output of toxins it may be an enormous gain.

A CASE OF ARTIFICIAL DOUBLE PNEUMOTHORAX.

BY

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IN a recent edition of a popular textbook on physiology the following sentence appears in the chapter on the mechanism of breathing: "A perforation of the chest wall would mean that the lung on that side would no longer be of use; a similar injury on the other side (double pneumothorax) would cause death." This statement, along with the impression so many, as well as myself, have always entertained, that the so-called vacuum in the parietal "space" must be retained on at least one side of the thorax, seemed at variance with the continued viability of the patient in the following case.

From the use of artificial pneumothorax in the treatment of pulmonary tuberculosis it is well known that one lung may be very greatly collapsed with little or no embarrassment to respiration. Through a fluoroscope the lung, which is under great collapse, can be seen to undergo a limited respiratory movement, and even when there is a decided positive pressure of gas this lung does not entirely cease to function. I was, however, not a little surprised to find a patient breathing quite comfortably and moving about the grounds of the institution with no embarrassment, although, in the routine treatment of a case of pulmonary tuberculosis by artificial pneumothorax, I had produced a double pneumothorax of some considerable size, through a patency existing between the right and left pleural spaces.

Mr. C. was considered a suitable patient upon whom an artificial pneumothorax should be produced in order to rest the right lung, which was extensively involved and gradually becoming worse, whilst no definite active lesions were found in the left lung.

The first four introductions of nitrogen were of small amounts, averaging about 250 c.cm. each time; and these probably went into pockets between adhesions, judging from the oscillations and readings of the water manometer. But on the fifth introduction a definite pocket of gas between the base of the lung and the diaphragm was discernible through the fluoroscope.

Pressures (Water Manometer), and Accompanying Amounts of Gas Introduced.

Treatment.	Interval.	Gas.	Pressure at Start.	Pressure at Finish.
Initial	—	Oxygen 100 c.cm. Nitrogen 250 c.cm.	—8	+10
Second	1 day	N 300 c.cm.	—3	+10
Third	6 days	N 235 c.cm.	—20	+10
Fourth	4 "	N 260 c.cm.	—8	+20
Fifth	3 "	N 450 c.cm.	—9	—4
Sixth	4 "	N 425 c.cm.	—6	0
Seventh	8 "	N 700 c.cm.	—4	+6
Eighth	2 "	N 800 c.cm.	—4	+8
Ninth	8 "	N 1,000 c.cm.	+5	+12

After the eighth treatment the area above the diaphragm on the left side showed a slight transparency with the fluoroscope, but after the ninth treatment a very distinct pneumothorax was seen on both right and left sides, lifting the bases of both lungs away from the diaphragm. The highest part of the bases of the lungs was at the level of the fourth intercostal space in the mid-clavicular line. The patient said he was "a little short of breath," and felt that he "had gas on the stomach," but, as stated before, being an "up" patient, he continued to walk about the grounds with little discomfort.

It was obvious that the continuance of the artificial pneumothorax was not advisable; so the next day I withdrew the gas by reversing the method of its introduction.

Quantity of Gas Removed and Changes in Pressure.

Quantity of Gas Removed.	Pressure after Removal.
Initial pressure	... +12
400 c.cm.	... +6
600 c.cm.	... +4
915 c.cm.	... +1
1,175 c.cm.	... +1
1,325 c.cm.	... —2

As soon as a negative pressure was obtained the operation was discontinued, but, as is shown in the x-ray plate, a considerable quantity of gas still remained on the right side. The gas was withdrawn at the same site as it was introduced in previous operations—namely, the eighth intercostal space in the anterior axillary line on the right side.

A study of the two x-ray plates showing the conditions before and after the withdrawal of the gas was instructive. The patency between the right and left pleural spaces was quite well defined at the time, when viewed through the fluoroscope. The extent of the involvement of the right lung was shown by the mottling of the organ. The adhesions in both lungs were well marked, and probably accounted for the marked depression of the diaphragm on both sides. Even after withdrawal of the gas the left lung showed a triangular transparent area indicating some retention.

Besides the physiological features mentioned and the anatomical peculiarity of a patency between the pleural spaces, which, of course, may have been the result of a tuberculous focus perforating the "partition" between the spaces, there is the further lesson conveyed of the indispensability of the fluoroscope, or x rays, in conjunction with the use of artificial pneumothorax, if the dangers of compressing a healthy lung at the same time as compressing the diseased one are to be avoided.

EPIDEMIC PNEUMONIC INFLUENZA AS SEEN IN MALAYA.

BY

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PNEUMONIC INFLUENZA broke out during the month of October, 1918, amongst the Tamil labour force on a rubber estate of which I was in medical charge, and was very fatal.

Lobar pneumonia is endemic in Malaya, and causes a fairly large proportion of the deaths among all classes of the community. Thus it may easily happen that the first few cases in an epidemic of this kind are regarded merely as an unusual incidence of ordinary lobar pneumonia. In this way valuable time may be lost ere precautions against the spread of the epidemic are taken.

While the disease produces a true pneumonia, there are many symptoms which serve to distinguish it from the ordinary lobar type of that disease.

The onset is usually heralded by a rise of temperature with hacking cough and a pain, which is almost invariably located by the patient in the front of the chest, and not at one side or another as in lobar pneumonia. The onset of this pain is preceded by sore throat and a nasal discharge; the latter persists during the illness. The coughing is painful, but the cough is not of the kind usually found in ordinary pneumonia. It is deep and full, and pain excited is much more generalized. The coughing occurs in long bouts, and in the intervals there is great exhaustion with the vocal breathing or groaning present in most grave illnesses. The facies is marked by an anxious look, which persists even after delirium has set in. The complexion is a yellowish-grey. The nostrils are dilated, and the reddened mucous membrane coated with encrusted haemorrhagic discharge is a notable feature in severe cases. The sputum is rusty and of the nummular form at first, but very speedily becomes more profuse and greenish-yellow, though remaining glutinous. Profuse epistaxis is common and of unfavourable import. Haematemesis and haemoptysis have both been seen in very severe cases, always as a terminal phenomenon.

The temperature exhibits a much greater diurnal variation than in lobar pneumonia, varying between 99° and 103° F., and usually touching both these limits in

each twenty-four hours. Delirium usually sets in much earlier than in lobar pneumonia, but it is very rarely violent or maniacal, even in alcoholics, but is of a muttering type, as in typhoid.

The pulse is by far the best guide as to progress in these cases. It falls in volume and increases in rate to a remarkable degree, almost as soon as the patient becomes ill. The rate rises to about 120, and in many cases that rate was maintained almost to the very end, with the pressure steadily falling. The respiratory rate is more variable, ranging from 40 to 60, or higher. The breathing differs from that in pneumonia. The breaths are deeper, and are not cut short in the way commonly seen in lobar pneumonia. The principal differences from ordinary pneumonia observed on auscultation are that practically no areas of complete absence of breath sounds are found, and the fact that all parts of both lungs are affected. Over the sternum and inner margins of the lungs loud bronchitic rales are heard, and further out, and towards both bases, coarse crepitations everywhere, with occasional patches of loud pleuritic rubbing. The sounds indicate a severe general bronchopneumonia with pleurisy. Percussion reveals areas of dullness in several parts of both lungs, or there may be a board-like dullness over a large area on both sides. The intercostal spaces are drawn in with inspiration. Deep and rapid breathing of the air-hunger type is frequently seen, and is of the gravest significance. The great quantity of sputum gives trouble very early in delirium, owing to the absence of efforts to clear the throat while coughing goes on. This leads to an accumulation of sputum in the throat which is very troublesome. The blood in these cases showed marked leucocytosis, especially of polymorphonuclear leucocytes.

Most of my patients were malarial subjects, and about 50 per cent. showed parasites in the blood, either active reproductive forms or crescents, but the course of the disease did not seem to be affected, the mortality being equal in those with parasites and those without.

Post mortem the lungs were either entirely or in great part hepatized. The pleura was covered with pus exudate, and there were many soft adhesions and free pus in the pleural cavity; the liver showed signs of early fatty degeneration, but the other viscera were not markedly affected. There did not appear to be any characteristic change in the spleen, though enlargement due to this specific disease might have been present and not distinguishable, owing to the malarial enlargement present.

The course of the disease was generally short. The mortality was very high, and no treatment appeared to be of the slightest avail.

I tried the injection of saline intravenously and intracellularly, and by the rectum, and quinine by various routes. I also tried novarsenobenzol intravenously, and exhibited salicylates and expectorants, besides giving the usual stimulant dietary, but the course was unaffected. The condition seemed to be one of severe toxæmia from the very commencement.

As with plague, typhus, and many other of the gravest epidemic ailments, prophylaxis should be given the first and greatest attention.

THE OCCURRENCE OF MORGAN'S BACILLUS IN CHRONIC DISCHARGING WOUNDS.

BY

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THE following observations were made on wound infections occurring in a Poor Law infirmary. Here it was noticed that certain deep wounds, which were moderately clean on admission, gradually went from bad to worse in spite of careful treatment. These cases ultimately developed chronic discharging sinuses, the discharge having a peculiar odour very like that of a bacillary dysentery stool. Several of these patients were obviously suffering from a toxæmia; blood cultures performed were negative.

Cultures made from wound discharges of six of these cases revealed the presence in all of an organism identical with Morgan's No. 1 bacillus.¹ This organism was the predominant one in most instances, but other organisms, such as streptococci and staphylococcus, were numerous.

Autogenous vaccines of Morgan's bacillus, given in two of these cases, greatly improved the wound and general toxic condition of the patient.

Where did this infection with Morgan's bacillus occur? Was it the cause of this chronic wound infection?

The points to decide were: (1) What organisms were present in the wounds on admission to the hospital? (2) What organisms gained entrance to the wounds during residence in the hospital? (3) The source of any infection developing whilst in hospital.

Technique.

Immediately on admission to hospital swabbings were taken from wounds of twenty cases. Cultures were made aerobically in broth, on agar, blood agar and MacConkey's bile-salt-lactose-neutral-red-peptone-agar, and incubated at 37° C., and on gelatine plates at room temperature for seventy-two hours. Anaerobic cultures were made in glucose broth incubated at 37° C. for four days. At weekly intervals, for as many weeks as the patient was detained in hospital, the above procedure was repeated. The stools of these cases were examined on two consecutive days for organisms of the dysentery group.

Results Obtained.

From the swabs taken on admission various micro-organisms were found, often a mixed flora, chiefly *Streptococcus viridans* and *Staphylococcus aureus* and *albus*, in one case *B. pyocyaneus*, and in another *B. perfringens*. In none of the cases could Morgan's bacillus be isolated. Examination of pus from these wounds whilst in residence in hospital revealed the presence of Morgan's No. 1 bacillus in five out of the twenty cases—that is, 25 per cent. These organisms made their appearance in two weeks after admission in four of the cases, and in the third week in the remaining one. This was the only modification found of the admission flora except in one instance, where *Staphylococcus pyogenes aureus* was superimposed.

Morgan's bacillus soon became the predominant organism in the five infected cases. In this connexion two agar platings might be mentioned. One plate developed 205 Morgan's bacillus and 26 streptococcus colonies, the other plate 226 colonies of Morgan's bacillus and 51 of *Staphylococcus pyogenes albus*, after incubation for forty-eight hours at 37° C. The characters of this Morgan-like bacillus¹ were fairly constant in all the cases observed—namely, a short Gram-negative bacillus, non-motile or feebly motile, fermenting glucose with the production of acid and a little gas, although in some there was no gas formed; slight acid production in maltose. Lactose, saccharose, mannite, and dulcitol were unchanged. Litmus milk was rendered slowly alkaline from the second day without previous acidity. Indol production was distinct in all except one case. This latter organism corresponded closely with Eyre's No. 9.²

As regards the source of infection with this bacillus, all the cases which developed this condition occurred in two wards widely separated and under different medical officers. The sterilized dressings used in the wards were examined on two occasions, with negative results. Stools of all cases proved to be negative to organisms of the dysentery group.

Agglutination reaction of the bacilli isolated with the patient's own serum yielded negative results, except in one case, where there was a positive reaction to a dilution of 1 in 40 in half an hour at 37° C.

Treatment.

Wounds infected with Morgan's No. 1 bacillus responded slowly, if at all, to ordinary surgical drainage and antiseptic dressing. In four cases treated by autogenous vaccine there was marked improvement of the local and general condition. The septic type of fever and odour began to disappear usually about three to four days after the first inoculation. Four to five inoculations were found to be sufficient. The dosage of vaccines employed was:

First dose	...	100 million	Morgan's No. 1 bacillus.
Second dose	...	200	" "
Third dose	...	300	" "
Fourth dose	...	400	" "
Fifth dose	...	500	" "
Sixth dose	...	600	" "

In two cases there was a marked local and general reaction after the first inoculation, but when this passed