Pathological Observations.

In June and July we made six *post-mortem* examinations of cases which had been diagnosed as influenza, bronchopneumonia, or pneumonia. Four of these were definitely cases of bronchopneumonia such as we found later in October and November, whilst the other two were examples of lobar pneumonia. Cultures made from one of these cases in which both lower lobes were consolidated yielded pneumococci and no *B. influenzae*; the other one showed grey hepatization of left upper lobe, a left-sided empyema and acute fibrinous pericarditis. This was the only case of pericarditis in our series.

In October and November we examined at autopsy 92 cases of influenza, all of them showing some involvement of the lungs.

In 23 of these cases Zenker's degeneration of the fibres of the rectus abdominis was evident in varying degree. The hyaline fibres were observed most frequently near the origin and insertion of the muscle. Along with the hyaline degeneration, or rather coagulation necrosis, in 11 cases there were haemorrhages into the sheath of the muscle, the blood being extravasated between the fibres and often causing their rupture. Whether the two conditions were in any way related we cannot state, but we have observed that often the ruptured fibres were hyaline. The most frequent site of the haemorrhage was two inches above the pubic rim and the extravasated blood could be seen showing through the aponeurosis and peritoneal coat on drawing back the flaps made by the abdominal incision. There was no discoloration of the skin over the haematoma, and in fact there was nothing on the surface to indicate its existence.

Abdominal Organs.

As regards the abdominal viscera there was nothing very noteworthy. A slight enlargement of the spleen was observed in a few cases, but hardly sufficiently marked for the organ to be palpated during life. There was engorgement of the veins as a result of the distension of the right side of the heart. In many cases there were ecchymoses in the wall of the stomach under the mucous membrane, *venae stellatae* of the kidneys were prominent, and occasionally there were petechiae in the renal pelvis.

Thorax.

Heart.—As a rule the right side was distended with blood, and presented the usual appearance seen in death from asphyxia. Cyanosis was common. The pericardial sac invariably contained about 50–100 c.cm. of clear yellow fluid but no case showed pericarditis or endocarditis. In three cases there were petechial haemorrhages in the visceral and parietal pericardium. The anterior mediastinal tissue frequently contained air as a result of the forced inspiratory efforts.

Pleura.—In 16 of the 92 cases there was a well developed pleural exudate consisting of 500 to 1,000 c.cm. of turbid yellowish purulent fluid. In 9 cases the right side, in 4 the left side, and in 3 both sides were involved.

Accompanying the fluid there was a very thick deposit of fibrin over the surface of the lungs and extending between the lobes. This deposit readily peeled off. The lung underlying the fluid was sometimes consolidated, but more often was spongy and in a state of capillary bronchitis.

Lungs.—In practically every case haemorrhages were present under the visceral pleura. The separate haemorrhagic surfaces varied from the size of a pin's head to that of a florin. In many the haemorrhagic areas were very irregular in size and shape and the surface of the lung had a speckled blotchy appearance. Of the 92 cases there were 4 where the condition might have been regarded as lobar pneumonia, in 13 capillary bronchitis would have been a fitting description, in 8 patchy bronchopneumonia, and in 67 diffuse bronchopneumonia.

In the capillary bronchitis cases the lungs felt spongy and were distinctly emphysematous at parts and showed no areas of consolidation beyond a few haemorrhagic areas. The trachea and bronchi were deeply injected and a considerable amount of mucus escaped from the cut bronchioles. In the patchy bronchopneumonia cases there were scattered areas of consolidation. Some of the areas consisted of extravasated blood forming infarcts, others contained a cellular exudate.

The most common condition was one in which almost entire lobes were consolidated, with the exception of their margins, which were invariably emphysematous in front. The lobes in such cases were plum-coloured, and the pleural surface was mottled with haemorrhages. On section there was an escape of much blood and serous oedematous fluid, the surface not being as dry as is the case with typical lobar pneumonia. The term "diffuse bronchopneumonia" probably best describes the condition. We were unable to associate any particular flora with the various lesions met with in the lungs. Cases of capillary bronchitis had the same *B. influenzae*, pneumococci, streptococci, and staphylococci which were encountered in those of diffuse bronchopneumonia.

During the latter months of 1917 and the whole of 1918 we had an opportunity of studying the lung condition as met with in 42 fatal cases of gas-shell poisoning. In these cases mustard gas was responsible for most of the lesions, though it may have been mixed with phosgene in many instances. We were impressed with the resemblances presented by the lungs in cases of influenza with those observed in the gas-shell wounds. The superficial burns of the skin and the necrosis of the lining of the trachea and bronchi were, of course, absent in the influenza cases, but the haemorrhages and mingled areas of emphysema and consolidation in the lungs were common to both conditions. In June we examined bacteriologically three cases of death from mustard gas, and found *B. influenzae*, pneumococci, staphylococci, and streptococci present in the bronchial secretion.

We consider that in influenza Pfeiffer's bacillus acts as a pioneer and prepares the way for pneumococci, staphylococci, and streptococci, which are able to grow and multiply in the damaged mucous membrane of the bronchi and subsequently invade the lungs and even the blood. Poison gas would seem to do the same nefarious work. In both cases there is a pronounced haemorrhagic tracheitis and bronchitis, the injection of the vessels at the bifurcation of the trachea being very intense.

REFERENCES.

W. J. Wilson, BRITISH MEDICAL JOURNAL, December, 1916. Wilson and Darling, *Lancet*, July 27th, 1918.

ANAESTHETICS: A MODIFICATION OF THE OPEN ETHER METHOD.

BY

J. FREDERICK W. SILK, M.D.,

SENIOR ANAESTHETIST AND LECTURER, KING'S COLLEGE HOSPITAL;
LATE LIEUTENANT-COLONEL R.A.M.C., AND CONSULTING
ANAESTHETIST MALTA AND THE HOME COMMANDS.

THE particular requirements of war surgery have given a great impetus to the use of ether as a general anaesthetic for routine work, and especially to its administration by the open method. The preference shown for this method is, perhaps, largely because, on paper at any rate, it seems to be so simple and so devoid of difficulty and danger. Omitting the question of safety, it will be found in practice, especially by the beginner, or if the attempt be made to use ether alone from start to finish, that the method is not so simple and easy as might at first sight appear.

In the course of the last three and a half years or more I must have paid close upon 1,000 visits to different war hospitals throughout the country, and so have enjoyed exceptional opportunities of watching the work and obtaining the views of other anaesthetists. From this experience I gather that the chief practical difficulties which present themselves when the attempt is made to use ether alone from the beginning are:

1. The period of induction is much prolonged. As much as twenty minutes has frequently been reported to me, and in some cases I have been informed that it had been absolutely impossible to get the patient under at all.
2. Nearly all patients object to the taste and smell of "straight" ether, and in those of the over-robust type and in the alcoholic this objection is frequently the prelude to respiratory spasm, lividity, and troublesome struggling.
3. In the same type of patient, too, complete muscular relaxation appears to be difficult or impossible of attainment.
4. The amount of ether used is often excessive. From 12 to 16 oz. an hour is no uncommon record, and I have known it to be even more. This, of course, is a trouble which makes itself felt by every occupant of the operating theatre.

5. The flow of mucus and saliva may be excessive, and when this is the case the patient is very apt to develop an undue amount of post-operative bronchial irritation.

Continuous practice will, of course, go a long way towards mitigating these troubles. The prior injection of morphine and atropine, especially the latter in tolerably large doses, is also a great help, particularly with regard to the excessive salivation and tendency to bronchial irritation.

Usually, however, the anaesthetist seeks to overcome the difficulties by starting with a little chloroform or "mixture" (equal parts of chloroform and ether, or 1 of chloroform to 2 of ether, or 2 to 3). This is generally administered upon the same mask as prepared for the ether alone—that is, twelve to sixteen layers of gauze with an underlying face-pad, and the patient is carried to the stage of complete anaesthesia, and the pure ether is substituted as soon as it is thought that he will no longer resent the change. In many, perhaps in the majority of instances, this plan succeeds well enough for all practical purposes, but in rather a large number of cases a tendency to respiratory and cardiac failure develops in the course of two or three minutes after the change to pure ether has been made. I believe myself, too, that in some cases deaths have resulted in this way.

To explain these untoward results, it has been suggested that the face-pad and thickish layer of gauze or lint used in the open ether process do not permit of a sufficient dilution of the vapour with air, as is so essential for the safe administration of chloroform, and that when the gauze is wetted, particularly with the heavy, semi-viscid chloroform liquid, an almost impervious or closed system is formed, with momentary accumulations of dense chloroform vapour immediately above the mouth. At any rate, it is quite clear that if chloroform or one of the strong mixtures be used for induction, the face-pad should be discarded, an entirely separate and much thinner mask employed, and the patient must be most carefully watched for the faintest indication of respiratory or other failure. Slight as these changes really are, they suffice to rob the open ether process of its simplicity, and therefore are seldom adopted.

Looking about for a means to overcome these difficulties, my attention was attracted by Dr. McCardie's excellent paper on "A Method of Anaesthetizing Soldiers," which appeared in the BRITISH MEDICAL JOURNAL of April 21st, 1917, in which he advocated the use, in a Clover's inhaler, of a mixture of 1 part of chloroform to 16 of ether. I proposed, therefore, to use this combination of 1 in 16 in lieu of the stronger mixtures alluded to above. Before doing so, however, I took the opportunity when in Birmingham to discuss the subject with Dr. McCardie. He expressed his doubts about my proposal, and said that he thought the same objections would apply to his 1 in 16 mixture as to the stronger ones. However, I gave the combination a trial, and, although it succeeded admirably in many cases, it obviously required careful watching, and in some few instances I received rather adverse reports about it.

I then experimented with various combinations of the two drugs, and have finally settled upon a mixture of the following proportions:

Chloroform	...	...	...	1 drachm
Ether	...	...	...	32 drachms (4 oz.)

This, it will be seen, is approximately 3 per cent. of chloroform in ether, or a very little stronger (3 in 99).

In using this attenuated mixture I have found that the following are the chief points to be attended to. Although not essential, it is of advantage that the patient should have a preliminary injection of morphine ($\frac{1}{2}$ grain to $\frac{1}{4}$ grain) and atropine ($\frac{1}{160}$ grain to $\frac{1}{80}$ grain). The face-pad and mask is the same as for open ether, the mask being closely applied to the face and face-pad from the very beginning. The liquid is used exactly as if it consisted of ether alone, the presence of the small quantity of chloroform being ignored. During induction the liquid is poured freely on to the mask just to the verge of resentment, but when consciousness and reflexes are abolished, it will suffice to reduce the supply to the dropping stage. If at any time during the course of the operation it be thought that the anaesthesia is not sufficiently deep, there need be no hesitation about increasing the amount. Needless to say, the same care in watching and maintaining the breathing are required in this as in any other method

of anaesthetization; the plan makes no pretence to be "absolutely fool-proof."

In my own hands and in the hands of many others who have tried it, the combination used in the way indicated has given excellent results. The advantages that I would claim for it are:

1. *Simplicity*.—There is no need to change the drop bottle or mask, or to remove the face-pad, which are the same as for the original open ether method.

2. *Rapidity*.—As the result of many careful time tests I have found that the patient is well able to be moved in about five minutes, and that the first incision may be made in another minute or so. At the outside, ten minutes should complete the whole process. This is a very great gain as compared with a possible twenty minutes—a gain both to the patient and the temper of the surgeon.

3. *Lack of Irritation*.—It is really quite remarkable how the addition of such a small quantity of chloroform should go so far in the direction of converting the pungent ether into a comparatively bland vapour. The consequence is that the patient has much less objection to the inhalation than when pure ether is used; there is also less respiratory spasm, less lividity; and the struggling is practically limited to the simple movements of the stage of excitement.

4. *Efficiency*.—This, of course, is a point upon which longer experience is desirable, but so far I have never had any difficulty in obtaining a sufficient degree of relaxation to satisfy the requirements of any of the surgeons with whom I have worked, and the depth of anaesthesia can be very readily regulated.

5. *Economy*.—The greatest expenditure of the liquid is naturally during the induction stage, but that seldom exceeds a couple of ounces, and I have estimated that for the maintenance of anaesthesia subsequently from 4 to 6 oz. per hour is ample. This is a very great saving and comfort to all concerned.

6. *Safety*.—Neither this nor any other anaesthetic can claim to be absolutely safe, nor can it be said that care and attention on the part of the administrator are less valuable assets than with any other drug or combination. On the face of it, however, I think that it is obvious that the possibilities of over-dosage with chloroform are much diminished when the half-drachm required for induction is diluted in two ounces of ether, given in ten rather than in two minutes, and that a drachm to a drachm and a half used in the course of an hour is but little likely to do much harm.

The flow of mucus and saliva and the subsequent tendency to respiratory irritation are much diminished, but I do not claim that this is to be wholly placed to the credit of the mixture, but rather to the routine use of full doses of atropine which I have always advised. I should point out, however, that on account of its relative rapidity of action the 3 per cent. mixture will be found useful to those who adopt the open ethyl chloride-ether sequence. In fact, I have myself made a few quite satisfactory experiments in the direction of using liquid ethyl chloride in lieu of chloroform, but I have not followed up this line of work, although I believe that it may be worth while doing so. One of the objects of this communication is to establish the principle of what I would call "attenuated mixtures," and to endeavour to show that "straight" chloroform or strong mixtures are by no means essential as an induction to open ether, but that, on the contrary, they introduce unnecessary risks in the open ether method.

TREATMENT OF ECZEMA BY RECTAL SALINE INJECTIONS.

By PERCY B. SPURGIN, M.R.C.S., L.R.C.P.

THE balneological treatment of certain forms of skin disease is nothing new; the internal administration of drugs as a means of cure is well recognized, and is, in certain cases, useful not only to alleviate symptoms but, in certain conditions, to cure the complaint.

The internal treatment, by means of saline injections into the bowel, is, I believe, something out of the common, and the following history, considerably condensed, of a very severe case of generalized eczema treated by this method, may be of interest to your readers.

C. M., aged 49, enlisted in August, 1915, and went to France shortly afterwards with a labour battalion. After being in France for twenty-five months, during which time he had fair health, he was sent home to England because of swelling of his ankles and feet. He was admitted to a military hospital and remained there for three weeks; he was then transferred to another military hospital, where he was a patient for three months. His knees were still swollen when he was discharged to a labour centre and recommended for a discharge centre.