emaciation this is an additional disadvantage. A method which obviates both difficulties is to use one of the inexpensive forms of vacuum flasks now on the market. An india-rubber cork with two holes is fitted to it, and through these two glass tubes are introduced; one, drawn out to a fine point, allows air to enter the flask; the other, which may conveniently be of the "two-way" kind, leads the fluid. Not more than 8 in. of narrow india-rubber tubing are attached to either limb of the two-way tube, and into the ends of each a small silver infusion needle is inserted. A wooden board laid across the sides of the cot, with a hole bored through the centre, acts as a support for the neck of the inverted flask.

This simple apparatus has proved so valuable in the wards, that it may be worth while to mention a few points about its use. The cork, tubes, and needles are sterilized by boiling; the flask is disinfected and scalded out with hot water; and though there is a theoretical objection in that it cannot be boiled also, no untoward results have followed in the large number of cases in which it has been employed. In order to warm the vessel, it is allowed to stand for a few minutes before use filled with sterile water at 120° F. This is then emptied and the amount of saline prescribed, *plus* about an ounce to allow for waste, is put in at a temperature of 120° F. This allows for a drop of 15° F. in transit through the tubing, and at 105° F. the fluid has been found to be absorbed most readily.

The child is laid flat on its back, and the limbs secured by bandages tied to the sides of the cot. The abdomen or thighs are prepared as for surgical operation, and when the needles have been inserted they are covered by a piece of sterile gauze or wool. The temperature of the fluid in the flask has been proved not to drop more than 2° or 3° F. in four hours. The amount usually ordered is about 7 oz., and takes two hours to run in. On one occasion where absorption was very rapid, 30 oz. were given continuously during the night to a baby 9 months old with excellent results. The rate of flow can be controlled if necessary by screw clamps or artery forceps on the tubing. A very few minutes is enough to start the working of the apparatus, and when once the fluid is running the nurse is free to attend to other duties. An occasional inspection to watch the rate of absorption is all that is necessary.

The feeding is perhaps the greatest difficulty. Water, preferably hot, is all that is allowed for twenty-four hours. It is best to feed the child at first with a spoon, as the great thirst induces the baby to take the bottle too greedily, and vomiting results. Whey has been extensively tried as the first food. It answers well, but has the disadvantage of producing a dirty condition of the mouth, even when made freshly every three or four hours. Frequent cleaning of the babies' mouths is undesirable, as it again causes a tendency to vomit. For this reason a 5 per cent. solution of glucose, to which albulactin may be added, is useful. Any real return of vomiting calls for a repetition of gastric lavage, but unless milk is started too early this is unlikely to occur.

Frequent repetition of the subcutaneous infusion is the only way to replace the enormous loss of water from the tissues caused by the frequent stools, and opium has proved very useful in checking diarrhoea at certain stages and in controlling the restlessness that is often an accompaniment. The weight was observed in one case to drop from 21 lb. to 14 lb. in eight days. There were frequent evacuations of large watery stools, which measured in some instances over three-quarters of a pint and were passed as often as twelve times in twenty-four hours. Seven ounces of saline were injected at twelve-hourly intervals under the skin for nine days, and the child began slowly to make up lost ground when diarrhoea ceased.

Milk, freely diluted with water and with the addition of sodium citrate, is tried only when the diarrhoea has shown signs of subsiding. The strength of the feeds is very gradually increased, but if the attack has been severe and has occurred in a marasmic child, the digestive functions often seem to be entirely suspended for a long while. Open air treatment has proved of the greatest possible value during convalescence. Of drugs, calomel in repeated small doses ($\frac{1}{10}$ grain every hour), castor oil $\frac{1}{2}$ to $\frac{1}{4}$ v, and opium seem perhaps the best; bismuth in anything but quite the late stages, the most deadly. Brandy is useful if its administration is not unduly prolonged.

Though the wards have contained so many cases it is interesting to record that in no instance has the complaint been contracted by children suffering from other diseases. The surgical ward is free from it, nor has it spread to the surgical cases in a ward which contains an equal number of surgical and medical beds. No case of intussusception has been met with. Two patients developed acute tetany, which subsided in three or four days, and was followed by recovery. Haematemesis and melaena have been uncommon but grave occurrences. Bronchopneumonia is a very fatal complication, and has been the cause of death in eight of our cases. It is preceded, probably in every instance, by collapse of the lung. That it has not occurred more often may be attributed to the excellent nursing the children have received, without which few of the recoveries could have been recorded.

REMARKS ON

A CASE OF PLEURAL TUBERCULOSIS WITH LARGE EFFUSION.

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THE following case furnishes a "record," as far as I am able to find, for the amount of fluid withdrawn at a single tapping from one pleural cavity. It is also interesting as showing a connexion between large exudations and a definite variety of thoracic tuberculosis.

A. C. M., aged 30, a drayman, tall and powerfully built, was admitted on January 5th, 1911, to the Cheltenham General Hospital, complaining of shortness of breath during the previous four weeks, intermittent stabbing pain in the right side, and a troublesome cough with little expectoration. He had suffered from dysentery and enteric fever about ten years previously in the course of the South African war. The family history was unimportant.

The usual signs of a full pleural cavity were found on the right side with slight generalized catarrh of the left lung. The day after admission 9 pints and 8 oz. (188 oz.) of clear yellow fluid were withdrawn from the right side through a small cannula in twenty minutes. At the end of the time the fluid was still running, but as the patient began to cough and his pulse showed irregularity, it was considered advisable to withdraw the instrument.

In spite of the relief this afforded the temperature and pulse-rate were not appreciably reduced, the general level of the one being 101° F., and of the other 100 to 120 per minute. Von Pirquet's test, tried on the fourth day after admission, gave a negative result. Tapping was soon needed again, and 90 oz. and 100 oz. were removed on separate occasions from the right side, while the left side, which was also found dull, yielded 60 oz. once. The fluid removed presented the characters of an exudate rather than a transudate. Fraenkel's pneumococcus was recovered from it, but no tubercle bacilli. The latter were also absent from the scanty sputum.

The temperature, after becoming intermittent in character, was practically normal from February 26th till April 6th, and during that time the patient was allowed up, and managed to walk about slowly. At the end of this remission the breathlessness increased, and 125 oz. were removed from the right chest with some temporary improvement; but the temperature began to be unsteady, and a repetition of the von Pirquet test gave a positive reaction.

Injections of Koch's tuberculin (100,000 mg.) at weekly intervals seemed to cause a slight retardation of the unfavourable course of the disease, the temperature becoming practically normal for three weeks; but the fatigue of going out in a wheeled chair on Coronation Day, intended to act as an auto-inoculation, was followed by a last stage of increasing weakness, laboured respiration, and cyanosis. Tapping the pleura towards the end yielded very small amounts of fluid (2 oz. on July 6th) and gave no relief, and on July 15th the patient died cyanosed and insensible.

Post-mortem Examination (July 17th).

Body somewhat emaciated. The right pleural cavity contained about three pints of turbid fluid with flakes of opaque lymph. The whole of the pleura, both parietal and visceral, was converted into a stiff membrane of almost cartilaginous consistence, varying in thickness from $\frac{1}{8}$ to $\frac{1}{4}$ in., being densest on the parietes near the root of the lung and thinnest on the lung itself; it was so closely beset with fibro-caseous deposit as to be uniform in consistence over its greater extent. The lung was bound down and retracted to about the size of a large fist. The left lung was generally but not uniformly adherent and contained some fluid between the adhesions. The pleura was in a similar condition to that of the right side but in a less advanced stage. Barring collapse the parenchyma of

both lungs was healthy and showed no signs of tubercle. The heart and pericardium were normal. The abdomen contained a considerable quantity of clear dark fluid, but there was no appearance of tubercle there or in the brain, nor was any other morbid appearance noted.

A parallel case of chronic tuberculous pericarditis recently under my care has been published elsewhere¹ by Dr. Rae, late house-physician in this hospital. Here the sac was greatly distended in the early stages of the disease, and after being twice aspirated was drained by free incision. As the heart was exposed to view during operation, and yet the real pathology was not recognized, it is to be presumed that the fibro-cascons change affected the parietal earlier than the visceral section of the membrane. If we may judge from the findings of the necropsy and the general behaviour of the case now recorded, the membrane lining the chest wall was similarly involved earlier than that covering the lung.

It would seem that in the early stages of the disease the reaction of the membranes to the subserous deposit results in a very large exudation which hampers the action of the underlying organ. The distress can be relieved temporarily by paracentesis as long as the stiffening and thickening of the surfaces, especially that on the viscus, are not mechanical factors of importance. But when once the fibrotic process has resulted in a rigid limiting of the free space and of the capacity of the included viscus to expand, we have to face a condition which gives little promise of relief by removal of the effusion. The latter indeed tends to become less rather than greater in amount as the disease proceeds.

So much stress has been laid in recent times on the important relation which exists between inflammatory pleural effusions and tuberculosis in the lung, latent as well as discoverable, that it is well to be reminded of some features of the substantive pleuritis which occurs definitely, if rarely, without necessarily affecting the underlying parenchyma.

Whether its early recognition will lead to any therapeutic advance remains to be seen. The diagnosis may not be very easy. In this instance the general history of the patient and his failure to respond at once to von Pirquet's test led one to hope that it was a case of "ordinary" pleurisy, which owed its severity to neglect.

Unless the process can be arrested early the massive changes observed give little hope that even a cessation of the specific activity of the tubercle bacillus would be of much benefit. The mechanical conditions of themselves entail a handicap that leaves the sufferer no outlook beyond a constant and increasing struggle for the breath of life.

REFERENCE.

¹ *Lancet*, April 22nd, 1911.

THE DETECTION OF TUBERCLE BACILLI IN SPUTUM.

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THE method of examining sputum for tubercle bacilli which is still in general use is that of preparing the films direct from the sputum by picking out of it the likely flocculi and spreading them out on cover-glass or slide. This method has never been considered satisfactory. Many processes have therefore been tried whereby the search for the bacilli may be made easier and more sure; but none have found general favour. A great improvement was effected by Uhlenhuth's method,¹ which consists in making the sputum homogeneous by the addition of "antiformin," and in examining the sediment that forms on standing, or after the use of the centrifuge. Its drawbacks are that a centrifuge of a high velocity is required, and that the sediment has to be specially fixed on to the slide. The necessity for such a centrifuge alone makes the original method impracticable for most practitioners. Both difficulties are overcome by an ingenious modification published by Koslow² in June of last year. As this improved method seems to be very little known, and as my results with it have fully borne out the advantages claimed

for it, I make no excuse for trying to draw to it the attention of those who take an interest in sputum examination. I have applied it now in several hundred cases, and can confidently recommend it as a great improvement upon all other devices.

The method is briefly this. A quantity of the sputum is shaken up with "antiformin" in a glass-stoppered vessel, such as a measure cylinder ("antiformin" = 15 per cent. liq. sod. hydrat. + liq. sodae chlorinat. aa), the proportion of "antiformin" depending upon the consistence of the sputum; if the latter is very viscid or dense an equal proportion may be required; if thin, then half the amount may suffice. The mixture is occasionally shaken during five minutes; it is then diluted with a volume of distilled water approximately ten times as great as that of the "antiformin" used, and again shaken for a few minutes. Finally there is added a mixture of equal parts of ether (methylated ether will do) and acetone equal in volume to that of the water. It is shaken once more for a few seconds and the whole allowed to stand. In a few minutes the contents of the bottle will be found to separate into three layers. The middle layer, appearing as a more or less dense white ring, will contain nearly all the tubercle bacilli that may be present in the sputum, and can be drawn off with ease by means of a pipette fitted with a teat. The density of this middle layer can be increased after it has been pipetted off, if desired, with the help of a centrifuge (an ordinary hand centrifuge will answer the purpose), but it is not necessary. A film is made, dried, and fixed in the usual way by passing it through a flame. Before staining the film I immerse it for a few seconds in 5 per cent. sulphuric acid to neutralize any adhering alkali, and wash to remove the acid. If the examiner is interrupted, or otherwise pressed for time, the whole mixture may be allowed to stand till the next day or even longer; the acid-fast property of the bacilli is not affected by the delay. The sputum-antiformin mixture should be diluted with distilled not with tap water, as the latter may contain acid-fast bacilli.

The advantages of the method are: (1) Its cleanliness; (2) a special armamentarium is not required; (3) the search for tubercle bacilli is more thorough and sure. A drawback might be found in the slight additional cost incurred by the use of ether and acetone; but the greater accuracy of the results—more than 15 per cent. of otherwise negative tests proving positive by this method—is surely adequate compensation.

REFERENCES.

¹ *BRITISH MEDICAL JOURNAL*, EPIHOME, ii, 1908, No. 220. ² *Berl. klin. Woch.*, 1910, No. 25, p. 1181.

BETWEEN three and four months ago the Automobile Association Motor Union introduced the system of issuing first-aid outfits to its patrols and obliging these men to qualify for first-aid certificates. The experience since accumulated shows that the step was a wise one, the patrols in question having dealt with 12 cases of injury by motor cars, and with 40 cases of injuries to cyclists and motor cyclists. They have also had occasion to render assistance on occasions not falling immediately within the scope of their duties. Thus, one patrol witnessed the fall of an aeroplane on the Coventry road, and was able to render prompt assistance to the injured aviator, while another patrol recovered from a well the body of a child, and tried artificial respiration, though not successfully, for upwards of an hour.

In a pamphlet, entitled *Simple Rules of Health and Courtesy for Those at School*, Dr. Helen MacMurchy, one of the medical officers to the Board of Education in Toronto, and Mr. H. W. Auden, Principal of Upper Canada College, have set forth the whole duty of school-aged man towards himself and his neighbour in some fifteen pages of short pithy sentences, such as "Clean teeth last long," "Dirty teeth decay," "Sleep on a hard mattress," "See that your nightclothes are hung up, not folded," "Never hold pins, needles, etc., in your mouth," "Never play with fire-arms," "You owe it to yourself and others to look your best always," "Do not interrupt people." A certain amount of guidance in respect of accidents and sudden illness is included, and since clearness of meaning is but rarely sacrificed to brevity, the pamphlet should play a useful part in training the rising generation of Canada. It is published by the Canadian branch of Messrs. Cassell and Co.