foot. The result of cord sympathectomy was poor. The right lower extremity shows some improvement, but the left was amputated two months afterwards for gangrene.

Male, aged 45 years. Rise of temperature under spinal anaesthesia 3°C . in the right foot and 1.6°C . in the left foot. The result of cord sympathectomy is fairly satisfactory, and a gangrenous ulcer on the inner side of the left ankle healed rapidly.

Male, aged 41 years. Rise of temperature under spinal anaesthesia 6.4°C . in the right foot and 5.8°C . in the left foot. The result of cord sympathectomy is entirely satisfactory, and the patient is in active work.

These results correspond closely with those of Adson, who has found, after the injection of a foreign protein, that unless the rise in skin temperature is two or more times greater than the rise of mouth temperature, sympathectomy is inadvisable.

CONCLUSION

In any case of thrombo-angiitis obliterans there is the element of vasospasm, which can be relieved by cord sympathectomy, and there is the element of thrombosis, on which operation is useless. The propriety of operating can be decided only by an endeavour to estimate the relative amounts of spasm and thrombosis. We feel that this can best be done in the lower limbs by a spinal anaesthetic. The method need involve no trouble for the patient, as the spinal injection is given on the operating table and the operation can be undertaken or abandoned on the findings given by the thermometer within five minutes of the injection. These advantages render this method much more attractive, safer, and quicker than those involving the intravenous injection of substances which commonly cause the patient considerable discomfort for some time. Furthermore, the response to a spinal anaesthetic gives an accurate record of what can be expected from sympathectomy, whilst Adson states that the rise in surface temperature induced by fever only "approximates roughly" to that following excision of the sympathetic supply.

A CASE ILLUSTRATING ARTIFICIAL PNEUMOTHORAX, ADHESION CUTTING, AND OLEOTHORAX

BY

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The publication of a solitary case, if it concerns treatment, is justly viewed with critical suspicion. My apology, therefore, for thus transgressing is not entirely that the case described is perhaps in some respects unique, but that it illustrates the potentialities of methods of treatment the value of which are still unrecognized by large numbers, if not the majority, of our profession. I must add that I am not advocating what follows as a routine procedure, as the opportunities for its applications may be few; but the indication is fairly definite—that action is compulsory when the patient is obviously declining—unless one is content to adopt an expectant attitude to the fatal end. There is little validity in the criticism of those who say that they have known similar cases recover without special treatment, when the indication, as I maintain, is the failure to recover by means of other treatment. Particularly is this so in tuberculosis of the lungs, where far too often the patient is allowed gradually, steadily, insidiously, to decline, with no effective effort being made to stem this decline, in the hope that some-

thing will turn up, or because of the hopeless attitude that there is nothing to do, or owing to failure to observe that things are going badly.

CASE RECORD

The patient was a child, aged 7, whom I saw in consultation with Dr. C. T. Neve in December, 1930. Her father was dying of phthisis and silicosis. She presented the symptoms and signs of bilateral bronchitis. Sputum was copious, and tubercle bacilli were constantly present. She lived at home

FIG. 1.

FIG. 2.

FIG. 1.—Appearance February 19th, 1931: Showing cavity in left lower lobe, with infiltration around it. Doubtful shadows radiating from right hilum.

FIG. 2.—March 9th, 1931: Showing artificial pneumothorax. Left lung partially collapsed. Cavity held open by adhesions.

on sanatorium lines, but rapidly became worse, the temperature remaining in the region of 101°F . for some weeks. She wasted. In February, 1931, there was bronchopneumonic consolidation of the left lower lobe, and a few crepitations were heard on the right side. X-ray examination revealed a very large cavity in the left lower lobe, and the appearances about the right hilum were very suspicious.

As a forlorn hope it was decided to attempt artificial pneumothorax treatment on the left side. This was done, but the cavity would not close owing to adhesions. It was decided to try to sever them. The child was extremely

FIG. 3.

FIG. 4.

FIG. 3.—May 18th, 1931: The adhesions have been cut. The cavity is almost closed. A small amount of olive oil has been injected into the pleural cavity.

FIG. 4.—July 27th, 1931: The cavity is closed. The lung is kept sufficiently collapsed by oil. The appearance was the same in February, 1932.

highly strung and nervous—so much so, that the usual local anaesthesia was thought to be unsuitable. She was given avertin. Unfortunately not enough was given, and gas and oxygen had to be administered as well. This considerably increased the difficulty of the procedure, as the respiratory excursions were consequently exaggerated and the chest wall was in violent movement throughout the operation. Thoracoscopy revealed a complicated maze of wide adhesions. In the belief that it was a question of completely collapsing the lung or leaving the child to die, it was decided to risk their

division, this being justified by the issues at stake. The whole operation was done through one cannula. A direct vision telescope was used, and alongside this were passed the diathermy electrode and the electro-cautery. Both were used. As general anaesthesia was being employed I did not infiltrate the insertion of the adhesion with novocain, with the object of saving time. This, I believe, was a mistake, as every time the diathermy cutting wire was used the spasm phenomenon in the muscles of the chest wall occurred, which greatly increased the difficulty of the operation. When the resistance of the tissues became great, or where they were thin, the electro-cautery was used. Thus, just when the adhesion became most difficult to deal with by diathermy, it became most easy with the electro-cautery. All adhesions were divided, and the child returned to bed in good condition.

Respirations had been so deep that much air was expelled from the pleural cavity, and the lung almost re-expanded, but subsequent refills produced an excellent collapse. The child so dreaded the refills that it was decided to substitute an oleothorax for the pneumothorax. This was done gradually. A year later the child was in good health, plump, bonny, and free from symptoms, and had gained over a stone in weight. At the time of writing she is still in good health, and I believe she will continue to remain so. Diagrams of the x-ray pictures show the appearances at different stages.

THE ACTION OF ERGOT PREPARATIONS ON THE PUERPERAL UTERUS

A CLINICAL INVESTIGATION WITH SPECIAL REFERENCE
TO AN ACTIVE CONSTITUENT OF ERGOT AS
YET UNIDENTIFIED*

BY

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With a Note by

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In a previous paper¹ a method was described by which the contractions of the puerperal uterus could be recorded in graphic form. The apparatus is a modification of that used by Bourne and Burn² to study the effect of oxytocic drugs administered during labour; it consists of a sterilized rubber bag, passed into the uterus with full antiseptic precautions, and connected by water-filled tubing to a mercury manometer. A light float on the manometer carries an ink-point, which records variations of intrauterine pressure on a slowly revolving drum. This apparatus registers the spontaneous contractions of the puerperal uterus, and shows very clearly the variations of activity brought about by suckling or by the administration of drugs.

The previous work[†] dealt with the action of the ergot alkaloids, ergotoxine and ergotamine, and the conclusions reached were these:

1. That both ergotoxine and ergotamine were very active in stimulating contractions in the puerperal uterus.
2. That while the precise action varied in different cases, every effect produced by the one drug could be matched by a similar effect from the other.
3. That the drugs were comparatively slow in taking effect: by intravenous injection four to ten minutes; by intramuscular injection fifteen to forty-five minutes; and by mouth thirty-five minutes to one hour or longer. When the drugs were given by the mouth the action was erratic, and in most cases not nearly so well marked as when given by injection.

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† The work on ergotoxine and ergotamine was carried out at the request of the Therapeutic Trials Committee of the Medical Research Council.

4. That the rise in the base line of the tracings (which may be taken as a measure of the tonicity of the uterus) was of moderate degree, and was seen only during the time that the drug was exerting its maximum effect: it was produced by doses of 0.5 mg. or more given by injection.

AIM OF PRESENT INVESTIGATION

Having found that the method used to study the clinical action of the ergot alkaloids was capable of yielding very clear results, I decided to extend the scope of the inquiry, and to investigate the effect of other constituents of ergot, and of the various pharmaceutical preparations of the crude drug.

In 1913 Carr and Dale,³ assuming, as then seemed justifiable, that the activity of ergot was due to ergotoxine, pointed out that worse methods of preparing the extractum ergotae and the extractum ergotae liquidum could scarcely be devised than those recommended by the *British Pharmacopoeia* of 1898 (which was then current). In the case of the first preparation the ergotoxine was precipitated during manufacture; in the case of the second the ergotoxine was not soluble in the watery solution used for extraction. Since that date it has frequently been said that the extracts in question are inert and useless preparations, although the statement has sometimes been qualified by a somewhat vague suggestion that the putrefactive bases (particularly histamine), which are also present in the extract, might possibly stimulate the uterus to contract. An unsatisfactory state of affairs was thus created, for it was obviously absurd to start with an expensive drug, to eliminate the active alkaloid, and then to allow non-specific putrefactive amines to form when these same substances might be much more easily and accurately produced in other ways. Such was the position when the present Pharmacopoeial Committee was formed, and it was therefore natural that one of its first acts was to constitute a special subcommittee to advise on a new and better method of preparing the ergot extracts.

Ergot has been of the nature of a treasure chest to pharmacologists, and the immense amount of work which has been done on this drug is evidenced by the number and variety of the chemical bodies which have been isolated. Some of these substances, such as histamine, are known to owe their presence in great measure to bacterial or enzyme decomposition during manufacture, and this leads to much uncertainty in the composition of the finished product, since but little control can be held over these processes. Of the various bodies isolated only two (other than the alkaloids) are believed to have an appreciable effect on the uterus. These are histamine and tyramine.

HISTAMINE AND TYRAMINE

Histamine (ergamine) is stated by Burn² to be present in the British pharmacopoeial liquid extract of ergot to the extent of 0.01 per cent. Two drachms of the extract (which is the dose commonly used for single administration) thus contains less than one milligram. Bourne and Burn have studied the effect of histamine given subcutaneously during labour. They found that doses of less than 2 mg. of the base were ineffective. A dose of 2 mg. produced vigorous contractions for fifty minutes, followed by a period of inertia. No details were given of the effect when administered by mouth. In the puerperal patients I have given histamine acid phosphate by the mouth in doses equivalent to 2 mg., 6 mg., and 8 mg. of the base. In no case were any contractions seen which could be attributed to the drug. The effect when given by intramuscular injection was different; a patient receiving a dose equivalent to 1 mg. of the base showed in less than one minute a very marked flush of the skin, which persisted for about