removed through the bronchoscope; in this case I feel that it is the only possible treatment that can give relief, short of a very grave surgical operation.

- (e) Certain cases of foreign body in the lung.
- (f) For diagnostic purposes for revealing tumours and their attachments by radioscopy and thoracoscopy.
- (g) In certain cases of abscess of the lung.
- (h) As a preliminary to operation in certain cases.
- (i) To control haemoptysis.

Contraindications.

The following contraindicate resort to the production of artificial pneumothorax:

1. Active disease in both lungs. This rule, however, must not be applied too rigidly, for many cases have been successful in which there was some disease on the other side.
2. Early phthisis which is becoming arrested by strict treatment on ordinary lines. Far greater efforts must be made generally towards diagnosing the disease when it is really early. Many cases called early are in reality advanced.
3. Emphysema or asthma are said to be contraindications, and if severe would obviously be so, but I have induced a pneumothorax in an asthmatical subject with no apparent ill effects.
4. Extensive tuberculous disease elsewhere.
5. Reluctance, undue timidity, lack of patience or of confidence on the part of the patient.

In writing thus I have intended to express an opinion, not to lay down the law. It would be beyond the intended scope of this paper to discuss what is early pulmonary tuberculosis, and yet it is a question intimately associated with the problems of pneumothorax treatment.

I take it that all will agree that, given symptoms of toxæmia (lassitude, evening fever, loss of weight) and tubercle bacilli in the sputum, with no physical signs either clinical or radiographical, or only slight signs, the case may be regarded as one of early phthisis, whereas if the signs indicate the involvement of an appreciable amount of lung tissue it can no longer be so regarded.

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LARGE ABSCESS OF LUNG: DRAINAGE BY POSTURE: RECOVERY WITHOUT OPERATION.

BY

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THE following case is interesting because it shows that a large abscess of the lung may disappear completely and fairly rapidly when the patient can discover a posture which enables him to cough up its contents.

A. B., a carter, aged 36, consulted Dr. Fraser of Chasetown in September, 1923, on account of epilepsy, from which he had suffered for many years. Dr. Fraser on that occasion remarked on the extremely septic and offensive state of the patient's teeth, and pointed out the necessity of having them extracted.

Before the man could make any arrangements to follow this advice he was taken suddenly ill, and Dr. Fraser found him suffering from a very acute and extensive pneumonia. On September 24th, the fourth day of the illness, the sputum became dark brown, copious, and very offensive.

On September 27th I saw him in consultation with Dr. Fraser, and agreed that the physical signs pointed to pneumonic consolidation of the right lung complicated by gangrene or abscess. I was unable to strike pus with an exploring needle. The patient's general condition was so

bad that I felt there was little hope of recovery. The slightest movement caused great distress and cyanosis, and to move him from his humble home to hospital was out of the question.

I made an autogenous vaccine from pneumococci and streptococci from his sputum; he was given a dose the following day and afterwards at intervals of five days. For the next five weeks he continued to expectorate a quantity

FIG. 1.—On admission to hospital, showing abscess cavity half full of pus.

of putrid purulent sputum; the temperature, which was irregular, seldom exceeded 103° F. He became pale and emaciated, and the fingers became slightly clubbed; on the whole, however, he seemed to have developed some immunity, and the signs of consolidation gradually cleared from the upper lobe; so that on November 7th, seven weeks after the commencement of his illness, he for the first time was considered fit to be moved, and was transferred to Queen's Hospital for x-ray examination and possibly operation.

The radiograph (Fig. 1) taken on November 8th showed a cavity half full of pus in the lower half of the right lung. The sputum was offensive but not very abundant.

FIG. 2.—Showing the posture which produced the maximum expectoration.

The patient's condition was so poor that I hesitated to submit him to an operation, especially as a needle failed to locate pus near the surface.

I ascertained that in a certain position (Fig. 2) he expectorated more freely, and I hoped to drain his abscess more efficiently by making him assume that position frequently. He was also given a preparation of garlic every four hours and the vaccine was continued.

Thereafter his progress was most satisfactory; the sputum lost its foul odour and became rapidly less in quantity, the pyrexia ceased completely, his appetite improved, and he gained a stone in weight during the next month. Gradually his extremely bad teeth were removed.

A radiograph taken about a month after admission showed a great diminution in the size of the abscess. He was discharged two months after admission, free from all symptoms of abscess and displaying no physical signs beyond some impairment of resonance over the right lower lobe and some diminution of breath sounds in the same region. When next seen, two months later, he was in good health and back at work. All abnormal physical

FIG. 3.—Four months after admission—no trace of abscess. Lung fields normal.

signs had then completely disappeared, and an x-ray examination (Fig. 3) failed to show any trace of his former lesion.

My object in publishing this case is to call attention to the striking and immediate benefit which followed the efficient draining of the abscess by the assumption of a suitable posture by the patient; there is nothing new in that.

INCUBATIONAL CHANGES IN THE RED CELL COUNT IN INOCULATED MALARIA.

(Preliminary Note.)

BY

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We have taken up Sir Ronald Ross's suggestion¹ that the treatment of general paralysis with malaria should also serve as an opportunity for studying the incubational period of malaria. This note deals only with changes in the red cell count.

Our nine patients were all European male inmates of the Pretoria Mental Hospital, most of them of long standing, but still in fairly good condition when the work was started. We have used one case of dementia praecox as a control. All patients were treated with one and the same strain of benign tertian malaria.

Method Employed.

Quantities of blood, varying between 0.5 and 10 c.cm., were taken from the vein of a patient with malarial fever, under aseptic precautions, but with no regard to the stage of his fever. This quantity was then immediately injected under the skin of the new patient, divided over as large an area as the needle could reach, and well rubbed in.

A drop of blood from the finger was diluted 200 times with the usual pipette, and counts were made with a Thoma-Zeiss counting chamber. From every pipette two drops were counted separately, and a hundred small squares were counted every time.

In a few cases morning and evening counts were made on the same patient. In the absence of fever there was hardly any discrepancy, but an intervening rigor always lowered the count. In such cases the mean was taken. The routine procedure, however, was one daily count performed at approximately identical hours for every patient. In every case counting was started a few days before the injection so as to obtain the average count.

Results.

Sir Ronald Ross¹ mentioned that S. Ben-Harel saw the red cells diminish, in canaries inoculated with *Protozoa*, as early as the day after inoculation, and this decline was progressive day after day, until from 0.5 to 2 million had disappeared from the original normal count of 4.5 to 5 million. We have found the exact opposite, as shown in the table. In it we have included other details about our patients which might be thought to have a bearing on the phenomena observed, although the connexion is none too obvious.

TABLE.

Case Number.	Dose Injected.	Incubation Period (days).	Average Cell Count before Injection (millions per c.mm.).	Highest Count Reached (millions per c.mm.).	Lowest Count Reached (millions per c.mm.).	Malaria in Patient's History.	Duration of Fever (days).	Fever stopped by—
1	5 c.cm.	12	4.7	6.4	3.1	?	33	Itself.
2	2	9	4.7	6.7	3.2	?	30	Neosalvarsan.
3	4	9	5.6	6.7	3.2	?	17	Neosalvarsan.
4	5	6	5.4	6.25	3.5	?	19	Neosalvarsan.
5	1	12	4.8	6.2	2.9	had	58	Neosalvarsan.
6	0.5	17	4.7	6.5	3.65	?	47	Neosalvarsan.
7	1.5	18	5.9	6.4	5.2	had	15	Itself.
8	2	9	6.8	7.9	6.5	?	12	Death.
9	10	14	5.9	6.8	5.3	had	5	Itself.

At the altitude of Pretoria a red blood count of nearly 6 million may be regarded as normal. From the table it is seen that many of our patients were anaemic before the injection of malarial blood. The high count reached by all of them after the injection is all the more remarkable. The very low count following on this is the usual malarial anaemia. But neither the rise nor the fall seems to stand in any fixed relation to the other features: to previous malarial history, to the dose of blood injected, and to whether we used neosalvarsan to stop the fever or it ceased of itself.

From our observations it is clear that an injection of malarial blood is followed by a rapid and marked increase in the number of red cells. This increase is followed by a decrease, and this decrease coincides more or less with the outbreak of fever, or possibly with the appearance of malaria parasites in the peripheral blood stream. Since all the cases injected with malarial blood showed this increase in cell count, and the one case injected with malaria-free blood showed no change at all, we may safely hold the malaria parasites responsible for the increase. This view is further supported by an observation in another patient who had received an injection of malarial blood but for some reason never got as far as a rigor. He just showed an irregular slight rise of temperature for a couple of days, after which the fever died out entirely. In this case a rise in the number of red cells was recorded from 5.04 to 5.78 million.

Conclusions.

A subcutaneous injection of from 0.5 to 10 c.cm. of blood containing benign malarial parasites is quickly followed by a rise in the red cell count amounting to somewhere between 10 and 30 per cent. This rise lasts several days, with minor daily variations, and is followed by a fall, which constitutes the malaria anaemia.

As an injection of malarial blood cannot very well lengthen the life of red blood corpuscles, the rise can only be explained