A case equally interesting as that just recorded, from the point of view of complication, but of entirely different nature, was the following.

A girl, aged 19 years, suffering from facial and submental lupus vulgaris, came under my care in November, 1925, and was put on ultra-violet ray treatment, the carbon arc light being employed. After about four months' treatment lesions highly suggestive of erythema induratum scrofulosorum, one of which broke down, appeared on the legs. Their distribution, however, tended to be at a higher level than is usually the case in this affection. I had never practised ultra-violet radiation in erythema induratum, and as the latter had developed during that treatment

Left leg of patient with erythema induratum (?) lesions; the large one shows developing ulceration.

I discontinued it. It is my practice to submit most patients suffering from erythema induratum to x-ray therapy, employing at the same time appropriate local medication—usually a resorcin ointment and lotion—and advising, where practicable, rest in bed or on a couch in the semi-recumbent position. The patient was treated on these lines. X-ray treatment was begun in March, 1926; a half Sabouraud pastille dose screened with 0.2 aluminium, the pastille remaining unscreened and equidistant from the part exposed and the source of the rays, was given; this was repeated in a fortnight, and again in a little over three weeks—that is, a total dosage of 1½ pastilles through 0.2 aluminium filter, distributed over a period of a little more than five weeks. This was associated with an ointment and lotion, as previously quoted, and rest enjoined. Healing followed. At the margin of the healed ulcer, the sole lesion which had ulcerated, an incomplete circle of yellowish colour persisted.

Pigmentation remaining after healing is a recognized feature in erythema induratum, but the unusual tint led me to submit a specimen to the pathological

department for examination, which elicited the following report: "The specimen shows a central area with atrophic epidermis surrounded by a swollen area in which the deeper layers show slight increase of pigment granules. No evidence of tuberculous disease is found." As these lesions had developed during ultra-violet radiation—and the patient had not spent long hours on her feet—I naturally hesitated about resuming that treatment. However, on May 2nd, 1927, I very cautiously began it again, and fortunately with no recrudescence of the affection.

PULMONARY ACTINOMYCOSIS.

BY

T. WARWICK PRESTON, M.D.LOND., M.R.C.P.,
ASSISTANT PHYSICIAN, CROYDON GENERAL HOSPITAL.

JAMES HOMER WRIGHT,¹ in his account of pulmonary actinomycosis, says:

"Definite features are usually wanting until the disease is far advanced. If the lungs are extensively involved there is cough with fetid, sometimes bloody, sputum and signs of bronchitis, pulmonary consolidation and cavity formation, usually in the lower lobes. Cachexia, anaemia, fever of variable type, and the 'habitus phthisicus' occur also. Frequent involvement of the pleura and thoracic wall are a prominent feature."

Most of the fairly numerous cases which have been reported in the literature from time to time conform more or less closely to the above classical description, and the majority of them have masqueraded for a considerable period as cases of pulmonary tuberculosis. Most of the authors seem agreed also in regarding the pulmonary variety as having the worst prognosis and being the least amenable to treatment. Thus Illich² collected 58 cases without a single recovery. Maier records 7 recoveries out of 35 cases.

Samuel West³ records 30 cases of actinomycosis of the lungs and pleura with 26 deaths; of the remaining 4 patients 1 was apparently cured, the others were discharged with the condition unrelieved, and were subsequently untraced.

Foulerton⁴ reports 14 pulmonary cases from the records of the Middlesex Hospital: 9 patients died, 2 were transferred to the infirmary in a hopeless condition, 1 was

untraced, and 2 were apparently cured. Of the 2 successful cases it would appear that at first operative treatment was employed without producing any favourable effect; cure seems to have been effected in one case by the administration of large doses of potassium iodide, in the other by means of an autogenous vaccine. Rickman Godlee,⁴ after a description of 13 cases of actinomycosis, states his opinion that although potassium iodide is useful, surgical intervention is of primary importance. Of his 4 pulmonary cases 3 patients died; the fourth recovered as the result of surgical intervention followed by the administration of potassium iodide in 40-grain doses three times daily. Bigland and Sergeant⁵ report the case of a man suffering from pulmonary actinomycosis complicated by empyema. The empyema cavity was washed out with colloid iodine; the patient, who recovered, also received intravenous injections of iodine, and potassium iodide in large doses by the mouth.

The two cases under my own care, which are described hereafter, seem of sufficient interest to be put on record, first, on account of the somewhat unusual mode of onset, and secondly, on account of their favourable response to simple medical treatment.

CASE I.

A married woman, aged 47, was admitted to Croydon General Hospital on August 11th, 1927, with a history of one week's cough, with offensive expectoration and pyrexia. She looked ill, and had a hectic flush on the cheeks; the temperature was 101° to 102° F., the pulse 128, and the respirations 24. She had an impaired note at the right apex, harsh breath sounds, and very striking post-tussic suction. She was coughing up thick yellow pus, which smelt so offensively that I made a diagnosis of abscess of the lung, although I must confess that I was decidedly puzzled as to its etiology. An x-ray photograph showed a dull opaque area at the right apex, which, however, was less extensive than I had anticipated from the physical signs and from the large quantities of offensive pus which the woman was expectorating. I decided to watch her for a few days before thinking of any surgical procedure, and in the meantime put her on the balcony and gave her creosote by the mouth and by inhalation.

A specimen of sputum was sent for examination, and on August 15th Dr. Guest reported: "The predominant organism is a Gram-positive filament, many of the filaments presenting true branching. I have little doubt that this is a case of actinomycosis." On August 18th a further specimen showed the same organism predominating; on August 19th it was still present, but in diminished numbers, and there was a profusion of streptococci. On August 22nd, however, the streptothrix filaments, showing true branching, predominated.

On receiving the pathological report I put the patient on potassium iodide, 10 grains thrice daily by the mouth, and started her on a course of intramuscular injections of lipiodol (Lafay) twice weekly, commencing with 1 c.cm. and increasing up to 10 c.cm. Altogether she received 87 c.cm. of lipiodol in this way during her stay in hospital. The iodide was also increased up to 40 grains thrice daily.

On August 27th I injected 20 c.cm. of lipiodol intratracheally by the crico-thyroid route—the technique employed being that recommended by Chandler⁷—the patient being semi-inverted and turned on her right side. I performed this operation principally in order to obtain a better defined x-ray picture of the abscess, but I also had it in mind that the procedure might be of some therapeutic value. The photograph showed dilated bronchi in the upper part of the right lung field, but the lipiodol had not entered into the opaque area of the apparently closed abscess cavity. While of some value from the point of view of localization, therefore, it is doubtful whether my procedure had the desired effect of bringing the lipiodol into contact with the actual area of disease. The cough gradually subsided, and after September 1st the patient had no expectoration.

The temperature remained high (evening 100° to 101° F.) until September 14th, after which it was normal until her discharge from hospital on October 10th. At this time she still had an impaired note to percussion at the right apex and a few coarse rales. Her general condition was excellent, and she had no symptoms at all. For two or three months after discharge she took tincture of iodine (French Codex), 5 minims thrice daily in milk; after that she had no treatment until October, 1928, when I put her on iodine again for a few weeks. At the present time her condition is excellent, and there is nothing abnormal to be detected in her lungs either by physical examination or by x rays.

No "clubs" were ever demonstrated in the sputum, but the branching filaments were so typical on four separate occasions that I do not think there can be any serious doubt as to the correctness of the diagnosis. Wright¹ says that the demonstration of filaments showing true branching justifies the diagnosis, even though clubs are never seen. The patient had never been in contact with horses or other animals and denied ever having chewed grass or straw. She had some vague dyspeptic symptoms, but there was nothing at all to suggest any abdominal focus of disease; a barium meal of the whole alimentary tract showed nothing abnormal.

I must express my great indebtedness to Dr. Guest, who first demonstrated the organism in the sputum. I must also thank Dr. P. W. Hamond, who took the x-ray photographs.

CASE II.

A hawker-green grocer, aged 65, stated that he had enjoyed good health up to March, 1927, except for occasional bronchitis in the winter; in March, however, he had a severe attack of bronchitis. He returned to his work in May, but his cough persisted, and in August he began to expectorate blood-stained sputum. He had never had severe haemoptysis, but up to the time when I first saw him (September 29th, 1927) he had brought up a little blood nearly every day. He complained of great weakness and said he had lost weight. His doctor had had his sputum tested for tubercle bacilli on several occasions, but with negative result. While sitting in the consulting room he coughed up about a drachm of dark, almost "prune-juice" coloured, blood. I thought of neoplasm as a likely diagnosis, but an examination of his chest showed nothing but a slightly impaired note at the left base and a few scattered rhonchi. A radiogram did not help much, the condition being suggestive of an indefinite diffuse fibrosis.

On October 6th Dr. Southgate reported long granular Gram-positive organisms in the sputum suggesting a streptothrix; some of the filaments showed true branching and many pus cells were present. A second specimen showed a streptothrix predominating, and Dr. Southgate expressed himself as having no doubt as to this being the causative organism.

The patient was admitted to hospital and 20 c.cm. of lipiodol (Lafay) was administered intratracheally by the crico-thyroid route, the patient being turned over on his left side. The radiogram showed diffuse bronchiectatic dilatations over the left lower lobe, but no actual cavitation was apparent. I am of opinion that the procedure was of some therapeutic value in this case, as the lipiodol was carried widely through the bronchial tubes of the left lung. This patient, being afebrile, and able to get about, was only kept an in-patient for a few days, treatment being continued in the out-patient department; this was essentially the same as in the previous case—namely, lipiodol intramuscularly and tincture of iodine 5 minims in milk thrice daily (French Codex).

In January the patient reported that he was feeling well, had very little cough, had brought up no further blood, and was putting on weight. A specimen of sputum contained no streptothrices. At the present time he is at work and in good health.

I am greatly indebted to Dr. Southgate, pathologist to Croydon General Hospital, for giving me the diagnosis. I must also thank Dr. Herniman-Johnson for his co-operation in the radiological department; and Dr. Easton of Thornton Heath, who sent me this case in the first instance.

REFERENCES.

- ¹ *System of Medicine*, by Osler and McCrae, third edition, vol. i. ² *Trans. Path. Soc. Lond.*, 1897. ³ *Proc. Roy. Soc. Med.* (Section of Surgery), 1913. ⁴ *Lancet*, 1901, i, 3. ⁵ *British Medical Journal*, 1923, ii, 61. ⁶ *Beitr. z. Klinik der Actinomykose*, Wier, 1892. ⁷ *British Medical Journal*, 1927, i, 228 (Chandler and Young).

THE TEMPERATURE IN PULMONARY TUBERCULOSIS.

BY

COLIN MILNE, M.B., CH.B.ED.

ALTHOUGH the importance of a rise or fall in the body heat as evidence of disease was recognized by Hippocrates its true significance has, curiously enough, rather fallen into the background, and that in an age in which accurate thermometry has become possible (Wunderlich, 1851). Now we require that if the temperature is to serve as a reliable criterion, it must be determined with exactness; various extraneous influences which may modify the correctness of measuring it have to be eliminated.

In view of the long-lasting discussion as to the best way of taking the temperature I investigated the different methods in several series of patients. By taking the oral and rectal temperatures simultaneously, twice daily for three weeks in one series, I found the tracings on the charts to be almost parallel, the rectal being the higher by about half a degree. The rectal temperature is probably the most accurate, its determination being unaffected by external influences; it is therefore recommended by many, but more time is required for taking it, and the procedure is not pleasant either for the patient or for the nurse. I found similarly that the oral and axillary temperatures were almost parallel, with an interval between them of about 0.4 of a degree. The axilla must be thoroughly dried for the reading to be accurate, and great care is necessary in the case of patients with a tendency to perspire, as is common in tuberculosis. Taking the temperature of a stream of urine I found most unreliable in practice; the temperature was at least a degree above that of the oral method.

The oral method of determining the temperature seems to me to be the most suitable, but the patient must remain indoors for fifteen minutes before it is taken, and keep his mouth closed, otherwise it is cooled by the surrounding air. The thermometer should be left for at least five minutes in the mouth, since even though it is marked as a half-minute or minute thermometer registration is frequently not complete in this time. If the temperature is about normal it is often three minutes before the mercury begins to move at all, though in the case of a temperature of 100° F., or more, this will be recorded within a minute usually. Each patient should have his own thermometer so that these precautions can be observed and the nurses be enabled to read off the results in rapid succession. When there are only two or three thermometers in a ward with eighteen or twenty patients temperatures near the normal are hardly ever recorded accurately, although marked rises are sufficiently well indicated to be registered sufficiently correctly. An additional reason for having separate thermometers is to prevent one patient from being infected by another, the thermometers being often hastily and imperfectly sterilized in carbolic lotion. There is also more chance of teaching patients to take their own temperatures, so that on returning home they may use the thermometer when they feel out of sorts and be guided as to the need for rest.

All the temperatures mentioned subsequently in this article were taken by the mouth.

What Constitutes a "Temperature."

After looking through the case-sheets of the first 450 male cases admitted to Creighton Sanatorium (1910-16), where there was a complete after-history and a period of residence in the sanatorium of at least six weeks, I have formed the following conclusions concerning male patients in particular.

Some may have a temperature of 98.4° F. or less in the evening, with very little "swing" between the morning and evening figures for long periods, during which the disease in the lungs steadily progresses. The evening temperature may continue steadily 99.4° F. in a patient with tubercle bacilli in the sputum, and yet he may be alive and well ten years later. A temperature above 99° F. persistently, especially if accompanied by a pulse rate of 90 or over, is very unfavourable. This is often noted when the larynx is affected. Many cases with an evening temperature of 98.8° or 99° F. do well. Some regard a sub-normal morning temperature, below 97° F., as of unfavourable import, but the after-histories of patients with temperatures of 96.8° and even 96.6° F. do not bear this out; many are still alive after ten years.

It is probable that each individual has his or her particular type of temperature. If this could be obtained while health was good and kept as a permanent record the diagnosis, treatment, and prognosis of pulmonary tuberculosis would be made easier. Even with our present limited knowledge the behaviour of the temperature is a guide to prognosis. In 450 cases with tubercle bacilli in the sputum, the duration of sanatorium treatment being six weeks or more, and a definite after-history being obtainable, the results in cases of fever (over 99° F.) were noted and tabulated (see Table I).

TABLE I.—Positive Sputum Cases.
Prognosis of 450 cases from the type of fever.

Type of Case.	Total.	Died in Two Years.	Died in Three to Five Years.	Lived Six or More Years.
Cases with normal temperature	230	82 = 31.5%	34 = 13.1%	144 = 55.4%
Cases with one relapse	35	12 = 34.3%	4 = 11.4%	19 = 54.3%
Cases with fever on admission, later normal	50	26 = 52.0%	7 = 14.0%	17 = 34.0%
Cases with two relapses	25	15 = 60.0%	2 = 8.0%	8 = 32.0%
Cases with continued fever	60	50 = 83.3%	5 = 8.3%	5 = 8.3%
Cases with three or more relapses	20	17 = 85.0%	2 = 10.0%	1 = 5.0%

It will be noted that cases with only one relapse had as good a prognosis as those always normal (34.3 per cent. of patients died in two years, as compared with 31.5 per