appeared to escape from it. On section it was soft, with pale areas, but not definitely caseous.

Lungs: Weight, left 17½ ozs., right 27½ ozs. The left lung was firmly adherent to the parietal pleura; fairly spongy throughout, the walls of the bronchi being evidently thickened. The right lung was densely adherent to the chest wall, especially posteriorly, where it could only be separated by cutting and tearing the tissue. In this way a pus-containing cavity was opened at the root of the right lung opposite the fourth and fifth dorsal vertebrae. At this point there were several cavities which communicated with large and dilated bronchi; one of these was in direct continuity with a passage that passed into the intervertebral space between the third and fourth dorsal vertebrae. The whole of the posterior portion of the lung was extremely fibrous and dense, but there was no conclusive evidence of tubercle, either in the organs themselves or in the bronchial glands.

Heart: Not hypertrophied; walls and valves normal. Liver: Weight 74 ozs.; seemed to contain an excess of fibrous tissue, being hard and firm; no amyloid change. Spleen: 12 ozs., soft and friable. Kidneys: Right 7 ozs., left 9 ozs., hard and firm; capsule peeled off easily; suprarenals natural. Intestines: Normal: no ulceration.

Spinal column: There is a marked curvature at the level of the third and fourth dorsal vertebrae. The abscess cavity at the root of the right lung opened into the spinal canal from the front, but the whole of the disease lay outside the theca. The dura mater was covered with thick granulations from the level of the third to the eighth dorsal roots, the condition affecting both posterior and anterior surfaces. On opening the theca, the cord presented a somewhat softened appearance at the level of the disease.

The left wrist-joint was carefully examined. No changes could be found in the internal aspect of the joint. The cartilages, synovial membranes, and surrounding tissues appeared normal. A section through the ends of the ulna and radius showed them to be thicker than normal, the increase in thickness affecting the dense bone more than the cancellous. The clubbed fingers showed little on dissection. The interphalangeal joints were intact; the terminal phalanx lay close to the nail, and it appeared somewhat broader but certainly no thicker than normal.

Longitudinal section through decalcified end of finger, showing absence of periosteal and arthritic changes, and presence of excess of subcutaneous fat in the bulbous end. The nail has been removed.

The left hand, the spinal cord, portions of various nerves, and pieces of lung, kidney, liver, and spleen were removed and preserved in formalin. These I examined with the following results:

Microscopical Examination.

The spinal cord: Sections from the cervical enlargement, from the upper and lower dorsal regions, and from the lumbar enlargement were stained by Nissl, by Weigert-Pal, and by Marchi methods. Nissl's method revealed no abnormality either in the number of the anterior horn cells or in their morphological characters. They had the appearance of being perfectly healthy. With both the Weigert-Pal and Marchi methods the usual degenerations, ascending and descending, could be seen in sections respectively above and below the lesion in the upper dorsal region. The median, ulnar, anterior crural, and sciatic nerves were stained by Weigert-Pal and Marchi, but no degenerated fibres were found. One or two digital nerves were dissected out from the left hand, but they showed no abnormality with the Marchi staining. One finger was amputated just above the terminal interphalangeal joint and decalcified. Longitudinal sections were cut, a photograph of one of which is reproduced. The nail had been removed before cutting. The section shows no appreciable alteration in the bones or joint. There is, however, an excess of subcutaneous fat in the pulpy end of the finger, accounting for its bulbous shape.

The lungs: Sections stained and examined revealed marked thickening of the pleura and a very fibrotic condition of the pulmonary tissue, with no tubercles or definite caseation. The liver, spleen, and kidneys were not remarkable. No microscopical examination of the brain or medulla was made. Sections of the pituitary body showed chronic inflammatory change but no tubercles.

The case resembles many others that have been described in the character of the changes found in the long bones. Thickening of the cranial vault has also been noticed by Jangerhans. It differs from others, such as that described by Thorburn in 1896, in the absence of periosteal thickening and arthritic lesions. The lack of direct evidence of tuberculosis is not unique, Chrétien in 1893 having reported an instance of the malady which was apparently the result of syphilis.

The examination of the nervous system in the present case by the best methods now at our disposal has not revealed the presence of any nervous lesion to support the supposed neurotic factor in the causation of the deformities.

THE PULSE-RATE IN PULMONARY TUBERCULOSIS.

By THOMPSON CAMPBELL, M.D. GLASG.,

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THE significance of the pulse-rate as a guide to prognosis in cases of pulmonary tuberculosis having forced itself upon my notice, a few observations on this point may be of interest.

An increase in the frequency of the cardiac contractions, with a tendency to an evening rise of temperature are well known, as two of the earliest indications—apart from physical examination of the chest—of a tuberculous process in the lungs, but I am not aware that attention has been previously called to the former as an aid to prognosis. The working classes, who form the constituency from which the applicants for admission to sanatoria in which gratuitous treatment is provided are drawn, as a general rule follow their employment or carry on their household duties for a surprisingly long time before seeking medical advice, and in most cases a period of complete rest must be allowed to tranquillise the circulation before assistance in arriving at a prognosis can be obtained from the consideration of the pulse-rate. A patient who has indulged in cycling or other violent form of exercise at a time when he was really unfit for such exertion will have a pulse-rate much in excess of that he would exhibit if under strict medical supervision; so that the effect of over-exertion in its various forms must be eliminated from the pulse-record before its significance can be properly estimated and weighed.

The question which the examining physician to a sanatorium is called upon to decide is: Can recovery or an approach to it be reasonably expected after treatment of the patient for six months? (as this period should be the ordinary limit of residence). After a careful consideration of the extent of the disease, as evidenced by the physical signs, and the acuteness of the process indicated by the course of the temperature, due regard should be paid to the pulse. Having noted the rate when patients presented themselves for examination prior to admission, and compared it with the record obtained during a week's confinement to bed, I find that on an average there is a decrease of 20 per minute in the latter case, the difference being naturally smallest when there has been the least departure from the normal rate in the first instance. Thus to form a true impression of the degree of impairment of

the vital powers in the case of a phthisical subject presenting himself in the consulting room, 20 beats can, on an average, be subtracted from the pulse-rate observed during the examination, and even more in the case of persons who are unusually excitable, though, needless to say, this cannot be made an obsolete rule. If, on making this allowance, the pulse-rate exceeds 100, the case is not likely to exhibit an approach to recovery in the time mentioned above, and is therefore not suitable for admission. Also in the case of patients under more direct observation, if, after a period of complete rest in bed, the pulse continues to run at or exceed 100, the outlook is not promising. However, as mitral stenosis is at times a factor in the causation of the disease, a pulse-rate exceeding 100 in such a case is not of such grave import so far as the tuberculous process is concerned, as an unusual rapidity will be found even in the earliest stage. In attaching a significance, therefore, to the pulse-record in cases of pulmonary tuberculosis, allowance must be made for the possibility of over-exertion, excitability under examination, and the presence of mitral stenosis; but, with these reservations, some assistance will be obtained in making a pronouncement regarding the probable duration of life. Cases, again, in which a tuberculous area in the lung has been cleared out by excavation, followed by a period of quiescence during which the cardiac pulsations may not exceed 84 per minute, are suitable for treatment, as there is a likelihood that life will be prolonged considerably by six months' residence in a sanatorium; so that a consideration of the pulse-rate may point to a more hopeful outlook than would at first sight be suggested by somewhat advanced physical signs. A pulse of 100 or more will usually be found to accompany an evening temperature reaching or exceeding 101°, and these two signs of grave import being persistently present in a case in which absolute rest has been enforced for some time, give little hope of treatment proving of any avail. A temporary condition such as that just described will be found in an acute onset of the disease, which is so frequent that numbers of patients date the commencement of their illness from an attack which has been designated "influenza" by their medical attendant. With confinement to bed and appropriate treatment the acute symptoms usually subside, and the case, if recognised thereafter within a reasonable time, falls into the category of those likely to prove amenable to treatment, with a pulse-rate of under 100. As acceleration of the pulse is found at the onset of the pulmonary affection, so a gradual fall will be found to take place if a case is making progress towards recovery. On inspecting the records of a number of cases in which recovery, or an approach to it, was obtained, this fact is demonstrated. Taking the register during the first week of residence when strict rest has been enjoined, and comparing it with the record of the last week when walking exercise extending to several miles has been allowed daily, a decrease in the pulse-rate has been found in the latter case, varying from a few beats to 16 a minute, the diminution being naturally least in the cases in which there was the slightest deviation from the normal in the first instance.

The details of two cases are appended:

Case.	Week of Residence.	Average Pulse-rate.
A. W.	1	96 per minute.
	5	92 "
	9	88 "
	13	84 "
	17	83 "
	27	80 "
Mrs. H.	1	92 "
	5	84 "
	9	77 "
	*12 to 14	106 "
	18 to 26	77 "

* During a temporary exacerbation of temperature.

PRESENTATION.—Dr. J. G. McNaughton has, on the occasion of his leaving Turriff, been presented by his patients and friends with an illuminated address and autograph album, together with a substantial purse of sovereigns.

THE POSITION IN WHICH THE REGURGITANT AORTIC MURMUR IS MOST CLEARLY AUDIBLE AT THE BASE OF THE HEART.

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Not long ago I read a paper in which special attention was drawn to the fact that in a case of aortic valve disease the regurgitant murmur was audible most loudly at the second left interspace close to the sternum. It was evidently considered that this was quite contrary to rule—at all events to textbook rule—and was worthy of special comment. I have repeatedly noticed in practice that the same weight is attached to the necessity of the aortic reflux murmur being loudest at the second right interspace. Indeed, such is the tenacity with which this view is held that it seems worth while to call attention to the fact that at least 95 per cent. of the cases in which aortic reflux occurs the diastolic murmur is heard much more loudly at the second left interspace close to the sternum than in the position usually assigned to it—namely, the second right interspace. This is a remarkable circumstance, and undoubtedly accounts for the fact that aortic reflux murmurs are constantly overlooked.

For my experience tells me that there is no heart murmur which more often eludes detection than this one; a murmur, too, which alone stands pre-eminently as the only one indication of undoubted valve lesion. Of course, the ordinary loud sound of a double aortic murmur is audible without the least difficulty, and to this my remarks do not apply. I limit them to that low-pitched, soft, aortic murmur which often accompanies but does not replace the second sound, and which is of evil significance.

Now, I do not say that the second left interspace close to the sternum is the locality in which the aortic reflux murmur is most loudly heard, but only that it is much more distinct there than in the position ordinarily assigned to it. The point at which the murmur is loudest is almost invariably the middle of the sternum, and it is frequently very loudly audible just above the xiphoid cartilage.

How has the mistake arisen? From the statements in the textbooks being accepted without enquiry, in a slavish tendency to copy erroneous teaching, in an indolent indifference; and, lastly, in the growing tendency to employ the binaural instrument. This last is, I believe, one of the most serious dangers that has ever threatened the practice of auscultation, and will, I am persuaded, if persisted in, lead very rapidly to the decline and fall of diagnosis of chest disease.

So little is it recognised that the murmur of aortic reflux is most obvious over the pulmonary area that the textbooks make no sign as to the futility of seeking the maximum intensity of the murmur in the position assigned by them, and, as I have already mentioned, the fact of the murmur being loudest over the second left interspace has been recorded as something out of the common and exceptional.

And yet as I write it is necessary to add that only so recently as yesterday I examined a case in which the reflux murmur was found to be more loudly audible over the right than the left second interspace.

This is just one of those cases that will fall into the remaining 5 per cent. of the total number, the occurrence of which is so exceptional as to prove the rule.

The matter is of more than merely theoretical importance. Everyone knows that some varieties of the aortic regurgitant murmur are most difficult to hear, being extremely soft and low in tone. Now, it stands to reason that in such cases the observer must listen at that spot where the murmur is most loudly audible, or he will be in great danger of entirely overlooking the adventitious sound.

My experience of aortic regurgitant disease is that, except in its unmistakable form, it is the most likely to be overlooked of all valvular lesions, and this especially in the case of those soft murmurs the prognosis of which is the worst possible, and in which it is therefore most necessary that a correct diagnosis be made. Over and over again have I been told that the second sound is clear at the second right interspace; but careful auscultation at the second left interspace