

can assume the characters of pneumonic tuberculosis of the lungs with cavity formation, it is impossible to accept reports before 1882 as very material evidence of the occurrence at the same time of malignant disease and progressive tuberculosis of the lungs.

Dr. V. D. Harris¹⁴ recorded a series of cases in 1892 of mediastinal malignant disease. Reference is made to two cases (Nos. xvi and xix) of tuberculosis of the lung combined with malignant disease. In the first-mentioned case sarcoma of the lung was present in the left lung in combination with chronic tuberculous disease; no bacteriological examination was reported, however. In Case xix the lower half of the right lung was occupied by a new growth (medullary cancer) and near the root of the lung was a large mass of new growth as large as the two fists; here also there was old tuberculous mischief at the apex of the right lung and to a less extent at the left.

In a contribution by Kurt Wolf¹⁵ a great effort is made to prove the comparative frequency of the combination of the two diseases; he says in not fewer than 13 out of the 31 cases reported by him was tuberculosis combined with malignant disease (cancer). On examining the reports of the cases, however, it would appear that the possibility of the combination occurred in only 8, namely, Cases i, ii, iv, vi, vii, viii, x, and xxiii. In Case i the tuberculosis was old, in Case ii tubercle bacilli could not be demonstrated in the granulomata described, in Case iv giant cells and caseation were quite absent, and no mention is made of tubercle bacilli. In Case vi fresh tubercles were present, some round the tumour, and a small tuberculous ulcer was present in the intestine; again no microscopic evidence is given of the presence of tubercle bacilli in the tissues. In Case vii giant cells and caseation were found; tubercle bacilli, however, are not mentioned. In Case viii giant cells were found in section of tuberculous pleurisy, but again no evidence of bacilli. Case x is important as being the first reported case met with in which giant cells and tubercle bacilli were demonstrated microscopically; in this case the cancer obstructed a bronchus and tubercles were present at the apex of the right lung; the patient was 54 years of age. In Case xxiii the evidence is very slight; tuberculous granulomata were present in the liver, but the other granulomata were cancerous; tubercle bacilli were not reported. Kurt Wolf goes so far as to say that he considered that in 8 of the cases of combined disease, the tuberculosis was the cause of the cancer. He calls attention to the fact that in more recent years cases have been reported (reference not given) in which cancer and tubercle have been present together in the same individual and even the same organ, but he does not say whether in such cases the tuberculous disease was active or not.

In support of his view that tuberculosis is the basis often for the development of cancer, he quotes the growth of cancer in a chronic tuberculous ulcer of the leg. He admits that the occurrence of primary cancer in a lung in which there is progressive tuberculosis is very rare; unfortunately he does not give the reference to these cases. In answer to the question how to account for the rarity of the development of cancer in a tuberculous cavity, he gives an explanation that does not seem quite satisfactory, for he says the cancer could only arise in those cases in which the tuberculous disease has not yet destroyed all the epithelium in the neighbourhood of the cavity. Pepper and Stengel¹⁶ do not report any cases of the above combination of tuberculous and malignant disease in any of their cases. Pässler¹⁷ reports four cases of malignant disease of the lung; in the third case cancer developed in a lung the seat of some old caseating tuberculous disease, but there is no mention of the discovery of tubercle bacilli. He also gives a brief account of 70 other cases drawn from former reports, and in only one of these, the fifty-third, a case of cancer of the bronchus, sections of the lung showed multinucleated cells. Kasem-Beck¹⁸ reports 2 cases of primary cancer of the lung, but tubercles were not present in either; he reiterates the statement made by Kurt Wolf of the occurrence of tuberculosis in 13 out of the 31 cases reported by the latter. Dr. Kingston Fowler¹⁹ found tuberculosis twice in 30 cases of malignant disease of the lung. Weismayr's²⁰ third case showed carcinoma of the peritoneum and pleura, and obsolete tubercle at the apex of one lung; no tubercle bacilli are reported.

CONCLUSION.

So far as can be gathered from the appended literature, the number of cases of progressive tubercle of the lung occurring in association with any form of malignant growth of the lung is very small—that is, if the absolute evidence of the presence of tubercle bacilli in the tissues is relied upon. The nodules present in the lung of the case above described were very suggestive of a tuberculous origin; the Ziehl-Neelsen method was applied merely as corroborative evidence with the negative result above stated.

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SEQUEL TO A CASE OF PULMONARY HYPERTROPHIC OSTEO-ARTHROPATHY : NECROPSY.

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IN THE BRITISH MEDICAL JOURNAL of February 8th, 1896, and in the *St. Thomas's Hospital Reports*, vol. xxiv, Dr. Rufenacht Walters published a full clinical report of a patient, J. M., under his care at the North London Consumption Hospital, who was suffering from a typical form of pulmonary hypertrophic osteo-arthropathy. The report was accompanied, in the first reference, by a photograph of the patient, and, in the second reference, by a skiagraph of one of his hands. It will suffice, therefore, to say that the man was an umbrella maker, aged 34, with a chronic form of lung disease, with the characteristic deformities of the upper and lower extremities and with a kyphosis of the upper dorsal vertebrae which was rightly judged by Dr. Walters, as the sequel proved, to be the result of a quiescent spinal caries.

J. M. was transferred from the North London Consumption Hospital on July 31st, 1899, and admitted into the National Hospital for the Paralysed and Epileptic under the care of Dr. Hughlings Jackson, to whom I am indebted for permission to publish these notes.

For six months previous to this date he had been losing power in his legs, and the paralysis had been preceded by acute pain in the region of the angular spinal curvature. He stated that he had been coughing up increasing quantities of sputum for three years.

On admission the man was found to be rather emaciated, and much troubled by a distressing cough and the expectoration of considerable quantities of thick purulent sputum. The lower extremities were paretic and rigidly flexed at the knee and hip-joints. Considerable impairment of sensation was present from the level of the umbilicus downwards. Delayed micturition and obstinate constipation had been noticed for some months. The arms and legs presented the deformities described by Dr. Walters, only in a more marked degree, and a skiagraph of one hand showed a striking resemblance to the one taken three years previously. There was no œdema of the feet. The physical signs in the lungs varied from day to day, but there was a permanent impairment of percussion resonance at both bases, with numerous bubbling râles heard on auscultation. The heart showed no signs of organic disease, and the liver and spleen were not enlarged.

On October 2nd, 1899, it was noted that the patient had become markedly dyspnoic, with cyanosis from time to time.

On October 7th the heart had become feeble and irregular, and on October 9th the patient died of gradual cardiac failure.

Dr. F. E. Batten, who performed the necropsy, has kindly supplied me with the following report of the macroscopical condition :

Body fairly well nourished. Marked curvature at level of third and fourth dorsal vertebrae. Enlarged ankle and wrist-joints; clubbed fingers with incurved nails; first finger of right hand partly absent. Skull considerably thicker than normal, and bone very hard and dense; otherwise no abnormality.

Brain : A good deal of œdema over surface and in substance. The convolutions appeared natural, and the vessels and nerves at the base normal. The pituitary body was soft on removal; a little pus-like material

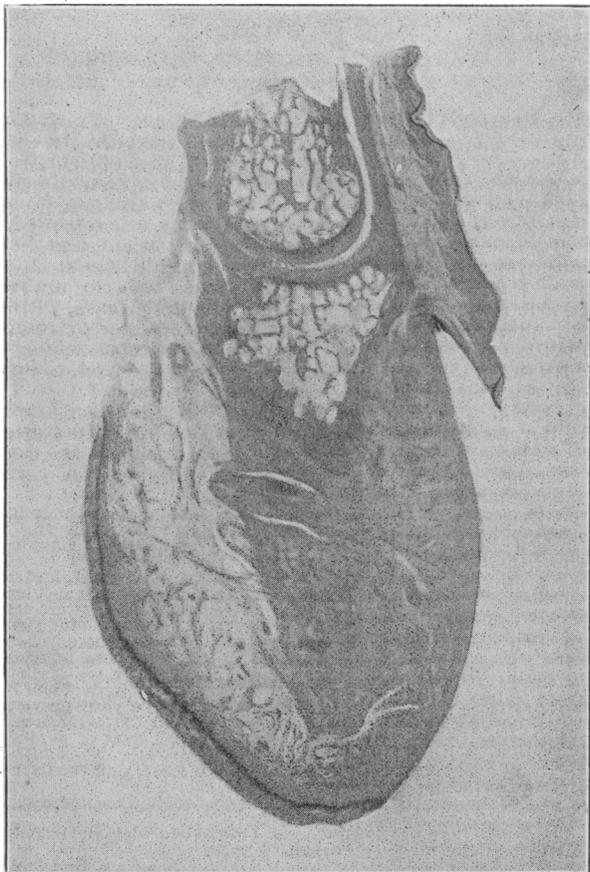
appeared to escape from it. On section it was soft, with pale areas, but not definitely caseous.

Lungs: Weight, left $17\frac{1}{2}$ ozs., right $27\frac{1}{2}$ 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.

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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