

was no jaundice, nor fever. His family history was good. He had had no previous illness until the before-mentioned typhoid; and had led a temperate life. On admission, he was a fairly well-formed and well-nourished man, with no appearance of cachexia. The epigastrium was painful on deep pressure, especially towards the right. Neither the spleen nor the liver was enlarged; there was nothing unusual in the circulatory and respiratory systems (no cough nor expectoration); tongue coated white and moist; constipation; the urine not albuminous, cloudy from urates. Pulse 80 to 84. Temp. 100.4° F. Four days after (Oct. 29), he had moderately high fever, with considerable remissions in the morning; the spleen was enlarged. On Oct. 31, there were observed for the first time several quite distinct roseolar spots. Next day, there were more spots; the abdomen was distended; he had bleeding from the nose, and, on Nov. 16, much bleeding from the nose and mouth. On Nov. 17, on the back of the right hand were several painless patches of erythematous redness, of the size of a florin. For the three or four days preceding death, there were cyanosis, and swelling of the left parotid gland; and pus was expressed from the duct. Death occurred on Nov. 22. The fever-curve, swelling of the spleen, and rose-coloured spots led to a diagnosis of typhoid fever. No doubt, he had had typhoid three years before; also the morning remissions of the temperature were extreme, and in the fourth or fifth week the high temperature still continued. At that time, miliary tuberculosis was thought of, and the fundus of the eye was searched for tubercles unsuccessfully. Finally, when suppuration in the parotid occurred shortly before death, all doubts about the case being one of typhoid disappeared. *Post-mortem*, there was not a trace of typhoid fever, nor any evidences of the typhoid three years before. But there were miliary tuberculosis of both lungs (the lung-substance being otherwise normal, except in the upper lobe on each side, where there was an indurated and contracted spot), tuberculosis of the bronchial glands, which were much enlarged and partly caseous, of the spleen, of both kidneys, and of the liver. The head was not allowed to be opened. The second part of the communication is occupied with a discussion of the case, and of the already recorded cases that come nearest to it.—*Lond. Med. Record*, Dec., 1881.

Pathology of Tubercle.

DR. SIDNEY COUPLAND gives the following summary of the present state of knowledge on this subject:—

1. Tuberculosis is an infective disease to which man and the higher animals are liable.

2. It is characterized anatomically by the formation of minute nodules or "granulations," composed of elements like those met with in granulation-tissue, the result of simple reparative inflammation.

3. These nodules, or elementary or primary "tubercles," may occur in an isolated manner, or, by their confluence, may form larger or smaller conglomerate masses.

4. The typical structure of each fully formed primary nodule consists in (a) a collection of lymphoid round cells, inclosed in a delicate fibrillar meshwork or stroma; (b) in an internal zone, more or less evident, of larger nucleated epithelioid cells; and (c) a central multi-nucleated or giant cell.

5. These "tubercles" arise apparently in connection with the lymphatic tissue that pervades the body. No region is exempt from them. They may occur in the substance of organs, in the bones and muscles, in serous membranes, as the pia-arachnoid, pleura, pericardium, and peritoneum; in synovial membranes; in

mucous membranes (arising in the submucous stratum), as in the mouth, pharynx, larynx, trachea, bronchi, intestines, and genito-urinary tract.

6. Being ill supplied with bloodvessels, they can only attain a certain size, and then perish. The central cells degenerate first, because they are the farthest removed from the nutrient blood stream, and mutual pressure due to their increasing growth hampers their vital activity. They become fatty degenerated, soft, opaque, caseous, forming "yellow" tubercles, which, when isolated, are larger and manifestly of older formation than the milary translucent gray granules. Where such tubercles are confluent, larger and more irregular caseous masses are formed. Caseation may pass into cretification. On the other hand, there is no doubt that occasionally the tubercular nodules take on a fibroid change, passing from the stage of "granulation-tissue" to one resembling "cicatricial tissue."

7. Almost invariably there occurs, in the vicinity of the tubercular formation, some reactive inflammation. This may be protective by ultimately leading to encapsulation by fibrous tissue of the caseated tubercular focus; or, as more frequently happens, it aids in the disintegration of the surrounding tissues, and leads, with the necrosis of the tubercles themselves, to destructive ulceration.

8. Individuals who are prone to the development of tubercle are called "tubercular." The disposition may be inherited. Probably what we recognize as "struma" or "scrofula" is only one form of this: a tendency to tuberculosis of lymphatic glands especially; just as in phthisical subjects we have a tendency to pulmonary tuberculosis.

9. The tubercular manifestation is, in the majority of cases, at first local, *i. e.*, limited to one organ tissue. It may remain so limited throughout life—may not even endanger life—or may lead to death by the local destruction to which it gives rise. On the other hand, it may be more or less widely diffused throughout the body of the same individual. The diffusion may be due sometimes to the simultaneous development of tuberclosis in many parts. More frequently it is due to secondary dissemination, by a process of infection.

10. This dissemination takes place, as in cancer, in two ways, *viz.*, by direct extension, or infection of neighbouring tissues by contiguity; and by general distribution of the tubercular virus through the medium of the blood-system (including lymphatics).

11. The tubercular virus seems to be most potent, or, at any rate, to retain its potency, *i. e.*, its infective property, in the caseous state.

12. Examples of the local extension of tubercle, or of propagation by contiguous infection are seen: (1) in the development of peritoneal tubercle from intestinal;¹ (2) in the spreading of tubercle from one part of an organ (*e. g.*, lung) to another part; (3) in extension from lung to pleura;¹ (4) in bronchial, laryngeal, and intestinal ulceration excited by the passage over their mucous membrane of material expectorated from a phthisical lung; (5) in tuberculosis of bladder and vesiculæ seminales following upon renal or testicular tubercle, etc. The mode of its local extension approximates tubercle to the neoplasma, *viz.*, by its elements exciting in the tissue they infect changes leading to the formation of cell-masses resembling the primary focus.

13. The generalization of tubercle is shown in the disease known as acute milary tuberculosis, which is characterized by an eruption of milary granulations in diverse organs and tissues. Its mode of occurrence may be (as above) compared to the general dissemination of secondary cancer, or, perhaps with equal truth, to the metastatic suppuration of pyæmia. With few exceptions, it appears to necessitate a primary tubercular focus to give rise to it. It is believed that the

¹ In these cases, probably by extension along lymphatic channels.

infective virus, whatever it be, enters the blood-stream at this local focus, and is thence widely disseminated, the resulting growths being for the most part milary, gray, and translucent; life not, as a rule, being prolonged for a sufficient length of time after the occurrence of the generalization to permit of the growths becoming confluent or caseous. As the membranes of the brain are generally involved in this widespread infection, death occurs early.

14. Lastly, tuberculosis is inoculable. In this respect, it resembles pyæmia, and differs from the cancers; for there is reason to think that it may be and is communicated from one human being to another, *e. g.*, from husband to wife, and *vice versâ*; and that it can be inoculated in animals from man (artificial tubercle). There is, further, a possibility, based on certain peculiar morphological resemblances of the formations, that bovine tuberculosis is communicable to man.

15. If the foregoing data be true, it follows that tuberculosis is an infective disease, probably due to the presence of a virus, which gives rise to the development of peculiar tissue-formations, capable of localized or general propagation in the body, and characterized by their tendency to early disintegration.

16. Until the nature of the virus is known, it is impossible to formulate data concerning the conditions under which the disease arises in subjects free from inherited taint.—*Brit. Med. Journ.*, February 11, 1882.

— *Pernicious Anæmia.*

In a series of cases of pernicious anæmia RIESS has found in the bone marrow an abundance of cell elements of a special character, which have rarely been met with. Besides the usual abundant colourless round cells and the nucleated red blood-corpuscles, there were many large cellular structures containing blood-corpuscles, such as have been hitherto described only by Cohnheim, and by Gardner and Osler. They were roundish or oval cells, with a refracting clear hyaline or slightly granular stroma. Their size varied considerably; the smaller were not more than twice as large as ordinary red blood-corpuscles, while the larger were eight times as large. The coloured elements which were contained in these cells also varied much in size and in number, ranging from one to twelve. When few, they resembled closely the ordinary red corpuscles, but more frequently they were smaller, darker, and more spherical, resembling the so-called microcytes. When very numerous they resembled rather fragments of red corpuscles aggregated in irregular groups. Sometimes these small elements were fused together in irregular masses. The nucleus of the containing cell was often concealed by them; and they sometimes occupied so large a part of the area of the cell that the protoplasm of the latter was reduced to a narrow circumferential zone. The number of these large cells in the bone marrow varied in different cases. Usually they were as numerous as the nucleated red blood-corpuscles, and sometimes exceeded these in number. They were found in five out of seven cases of pernicious anæmia examined. Of the two cases in which they were not found one was not a pure case, being complicated with an affection of the kidneys, and, in both, circumstances prevented a very thorough microscopical examination. These bodies, on account of their supposed rarity, have hitherto been regarded as arising from the destruction of red blood-corpuscles. In favour of this view are the form and colour of the contained corpuscles, which so often resembled fragments of corpuscles. But on this view the frequent appearance of these cells in pernicious anæmia is not easy to harmonize with Neumann's theory, according to which the bone marrow in this disease is the seat of an increased formation of corpuscles. It must be assumed that there is a corresponding increase in the destruction of cells in the lymphoid medulla. In accordance with this the blood-corpuscles in